

10297.204.ST25.txt
SEQUENCE LISTING

<110> Novozymes A/S
Jørgensen, Steen Troels
Rasmussen, Michael Dolberg
Andersen, Jens Tønne
Olesen, Peter Bjarke
Clausen, Ib Groth

<120> Improved Bacillus Host Cell

<130> 10297.204

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<170> PatentIn version 3.2

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Lys Lys Arg Tyr Tyr Ile Gln Ala Asp Asp Thr Gln Ala Leu Thr Arg
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 45 50 55
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 365 370 375

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 Val Pro Asp Gln Ala Arg Arg Gln Asp Val Asn Val Val Leu Ser Asn
 380 385 390 395

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Val Thr Ala Cys Ala Thr Gly Thr Asn Ser Ile Gly Asp Ala Phe Lys
 165 170 175

Val Ile Gln Arg Gly Asp Ala Asp Val Met Ile Ser Gly Gly Thr Glu
 180 185 190

Ala Pro Leu Thr Arg Met Ser Phe Ala Gly Phe Ser Ala Asn Lys Ala
 195 200 205

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 245 250 255

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 260 265 270

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 290 295 300

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 305 310 315 320

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 340 345 350

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60 65 70 75

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80 85 90

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95 100 105

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Ala	Asp	Arg	Leu	Leu	Ser	Ala	Ala	Ser	Arg	Met	Gly	Ala	Thr	Trp	His		
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Ala	Asn	Asp	Val	Val	Leu	Gly	Met	Pro	Met	Met	Cys	Arg	Leu	Gly	Ser		
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Ala	Ala	Leu	His	Ile	Pro	Gly	Met	Val	Met	Asn	Leu	Leu	Pro	Leu	Arg		
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Ser	Gly	Glu	Met	Met	Lys	Leu	Arg	Arg	His	Gln	His	Tyr	Arg	His	Glu		
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Glu	Leu	Arg	Arg	Asp	Leu	Lys	Leu	Leu	Gly	Glu	Asn	Gln	Arg	Leu	Phe		
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Gln	Ala	Thr	Pro	Thr	Leu	Trp	His	Ala	Leu	Ala	Ser	Ser	Ala	Pro	Glu	
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Ser	Leu	Ala	Arg	Gln	Leu	Gln	Gln	Leu	Ala	Cys	Ser	Leu	Thr	Asn	Leu	
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	1485					1490					1495	4994
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Arg	Glu	Asn	Met	Leu	Ala	Asp	Trp	Ser	Lys	Ser	Ser	Asn Ser Ile
	1500					1505					1510	5039
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Pro	Cys	Ser	Ser	Leu	Pro	Val	Leu	Phe	Glu	Lys	Gln	Ala Ala Lys
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Asp	Pro	Glu	Ala	Val	Ala	Val	Ile	Cys	Glu	Asn	Asn	Ala Leu Thr
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Tyr	Gly	Glu	Leu	Asn	Lys	Arg	Ala	Asn	Arg	Leu	Ala	His Leu Leu
	1545					1550					1555	5174
atc	gcc	aaa	ggg	gtc	ggc	ccc	gaa	caa	ttt	gct	gcc	ctg gcg ctg
Ile	Ala	Lys	Gly	Val	Gly	Pro	Glu	Gln	Phe	Ala	Ala	Leu Ala Leu
	1560					1565					1570	5219
cca	aga	tct	ttg	gat	atg	gtt	gtc	gga	ttg	ctt	gca	gtg ctg aag
Pro	Arg	Ser	Leu	Asp	Met	Val	Val	Gly	Leu	Leu	Ala	Val Leu Lys
	1575					1580					1585	5264
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Ala	Gly	Ala	Ala	Tyr	Val	Pro	Leu	Asp	Pro	Asp	Tyr	Pro Ala Glu
	1590					1595					1600	5309
agg	ata	gcg	ttt	atg	ttg	aat	gat	gcc	cat	cct	gtc	tgc atc gta
Arg	Ile	Ala	Phe	Met	Leu	Asn	Asp	Ala	His	Pro	Val	Cys Ile Val
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Thr	Ser	Ser	Ala	Val	Glu	Ser	Asn	Leu	Ser	Val	Pro	Gly Ser Val
	1620					1625					1630	5399
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Glu	Arg	Ile	Val	Leu	Asp	Asp	Pro	Cys	Ile	Gln	Glu	Glu Leu Lys
	1635					1640					1645	5444
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Gly	Cys	Ala	Ala	Ala	Asn	Pro	Cys	Asp	Ala	Asp	Arg	Thr Ala Pro
	1650					1655					1660	5489
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Leu	Leu	Pro	Leu	His	Pro	Ala	Tyr	Val	Ile	Tyr	Thr	Ser Gly Ser
	1665					1670					1675	5534
acc	ggc	aag	ccg	aaa	gga	gtc	gtt	gtt	ccg	cat	caa	aat gtc gtg
Thr	Gly	Lys	Pro	Lys	Gly	Val	Val	Val	Pro	His	Gln	Asn Val Val
	1680					1685					1690	5579
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10297.204.ST25.txt												
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Asp	Val	Trp	Thr	Met	Phe	His	Ser	Tyr	Ala	Phe	Asp	Phe Ser Val
1710						1715					1720	5669
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Trp	Glu	Ile	Trp	Gly	Ala	Leu	Leu	Asn	Gly	Gly	Arg	Leu Ile Val
1725						1730					1735	5714
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Val	Pro	His	Thr	Ile	Ser	Arg	Ser	Pro	Ala	Glu	Phe	Leu Asn Leu
1740						1745					1750	5759
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Leu	Val	Arg	Glu	Gly	Val	Thr	Val	Leu	Asn	Gln	Thr	Pro Ser Ala
1755						1760					1765	5804
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Phe	Tyr	Gln	Leu	Met	Gln	Ala	Asp	Arg	Asp	Asn	Ala	Glu Thr Gly
1770						1775					1780	5849
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Lys	Leu	Leu	Ser	Leu	Arg	Phe	Ile	Ile	Phe	Gly	Gly	Glu Ala Leu
1785						1790					1795	5894
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Glu	Leu	Lys	Arg	Leu	Glu	Asp	Trp	Tyr	Glu	Arg	His	Pro Asp His
1800						1805					1810	5939
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Phe	Pro	Arg	Leu	Ile	Asn	Met	Tyr	Gly	Ile	Thr	Glu	Thr Thr Val
1815						1820					1825	5984
cat	gtc	agc	tat	att	tct	ctc	gat	cag	cag	act	gcg	gca ctt caa
His	Val	Ser	Tyr	Ile	Ser	Leu	Asp	Gln	Gln	Thr	Ala	Ala Leu Gln
1830						1835					1840	6029
gcg	aac	agc	ctg	atc	ggc	cag	ggg	att	ccc	gat	tta	ggt gta tat
Ala	Asn	Ser	Leu	Ile	Gly	Gln	Gly	Ile	Pro	Asp	Leu	Gly Val Tyr
1845						1850					1855	6074
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Val	Leu	Asp	Glu	Tyr	Leu	Glu	Pro	Val	Pro	Pro	Gly	Val Thr Gly
1860						1865					1870	6119
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Glu	Met	Tyr	Val	Ser	Gly	Gly	Gly	Leu	Ala	Arg	Gly	Tyr Leu Gly
1875						1880					1885	6164
aga	ccc	gat	ttg	aca	gca	gac	cgc	ttt	gtc	gct	gat	ccg ttt ggt
Arg	Pro	Asp	Leu	Thr	Ala	Asp	Arg	Phe	Val	Ala	Asp	Pro Phe Gly
1890						1895					1900	6209
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Pro	Pro	Gly	Thr	Arg	Met	Tyr	Arg	Thr	Gly	Asp	Leu	Ala Arg Arg
1905						1910					1915	6254
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Arg	Gln	Asp	Gly	Ser	Leu	Asp	Tyr	Met	Gly	Arg	Ala	Asp Gln Gln
1920						1925					1930	6299
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Ile	Lys	Ile	Arg	Gly	Phe	Arg	Ile	Glu	Leu	Gly	Glu	Ile Glu Ala
1935						1940					1945	6344
gtg	ctt	gtc	cgc	cat	cat	aga	gtg	aat	caa	gcc	gct	gtg gtc gta

10297.204.ST25.txt
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 1950 1955 1960

agg gaa ggc cag ccc ggg gac aag cgt ctg atc gcc tac gtt gtc 6434
 Arg Glu Gly Gln Pro Gly Asp Lys Arg Leu Ile Ala Tyr Val Val
 1965 1970 1975

ccg gcg tct gaa gaa gaa acc gat ccg gct gag ctg cga cgg ttt 6479
 Pro Ala Ser Glu Glu Glu Thr Asp Pro Ala Glu Leu Arg Arg Phe
 1980 1985 1990

gcc gca ggc act ctg ccg gag tac atg gtg cct tcc gca ttt gta 6524
 Ala Ala Gly Thr Leu Pro Glu Tyr Met Val Pro Ser Ala Phe Val
 1995 2000 2005

aaa att tca gag ctg cca ttg act cca aat ggc aaa ctt gac cga 6569
 Lys Ile Ser Glu Leu Pro Leu Thr Pro Asn Gly Lys Leu Asp Arg
 2010 2015 2020

aaa gcg ctg cct gag cct gac ttt gcc gcg gct gtt aaa ggg cgg 6614
 Lys Ala Leu Pro Glu Pro Asp Phe Ala Ala Ala Val Lys Gly Arg
 2025 2030 2035

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 Gly Pro Arg Thr Pro Gln Glu Glu Ile Leu Cys Asp Leu Phe Ser
 2040 2045 2050

gaa atc ctc aat gcg ccg aga gtc ggt att gat gac gga ttc ttc 6704
 Glu Ile Leu Asn Ala Pro Arg Val Gly Ile Asp Asp Gly Phe Phe
 2055 2060 2065

gaa ctt ggc ggg cat tct ctt ctc gcc gta cag ctg atg agc cgc 6749
 Glu Leu Gly Gly His Ser Leu Leu Ala Val Gln Leu Met Ser Arg
 2070 2075 2080

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 Ile Arg Glu Ala Leu Gly Val Glu Leu Gly Ile Gly Asp Leu Leu
 2085 2090 2095

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 2100 2105 2110

ggc agg caa agt gcg ctg gat gta atg ctt ccg ctg aga acc gga 6884
 Gly Arg Gln Ser Ala Leu Asp Val Met Leu Pro Leu Arg Thr Gly
 2115 2120 2125

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 Gly Ser Gln Asp Pro Leu Phe Cys Val His Pro Ala Gly Gly Leu
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 Ser Trp Cys Tyr Ala Gly Leu Met Thr Ala Leu Gly Lys Glu Tyr
 2145 2150 2155

ccg ata tac ggc ctt caa gcc cgc ggg atc gca agg cag gaa gag 7019
 Pro Ile Tyr Gly Leu Gln Ala Arg Gly Ile Ala Arg Gln Glu Glu
 2160 2165 2170

cta cct gat acg ctc gac gac atg gct gct gat tat att cgg cac 7064
 Leu Pro Asp Thr Leu Asp Asp Met Ala Ala Asp Tyr Ile Arg His
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 Ile Arg Thr Ile Gln Pro Thr Gly Pro Tyr Arg Leu Leu Gly Trp
 2190 2195 2200

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10297.204.ST25.txt

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	2220					2225					2230						
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Pro	Asn	His	Phe	Leu	Pro	Ile	Lys	Asp	Ala	Pro	Asp	Glu	Gln	Glu			
	2235					2240					2245						
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Ala	Leu	Ile	Ala	Leu	Leu	Ala	Leu	Gly	Gly	Tyr	Asp	Pro	Asp	Ser			
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Leu	Asp	Gly	Ala	Pro	Leu	Asn	Leu	Ser	Ser	Ala	Ile	Asp	Ile	Leu			
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Arg	Arg	Asp	Gly	Ser	Ala	Leu	Ala	Ser	Leu	Asp	Glu	Ala	Ala	Ile			
	2280					2285					2290						
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Glu	Tyr	Lys	Pro	Arg	Val	Phe	His	Gly	Asp	Ile	Leu	Phe	Phe	Lys			
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	2340					2345					2350						
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Cys	Arg	His	Lys	Asp	Leu	Cys	Gln	Pro	Glu	Pro	Leu	Ala	Glu	Ile			
	2355					2360					2365						
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Gly	Arg	Arg	Val	Ser	Glu	Lys	Leu	Asp	Asp	Leu	Lys	Lys	Asp	Thr			
	2370					2375					2380						
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Asp	Lys																
	2385																
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gg	ca	gg	gt	gc	gt	ct	gc	gg	ga	ag	gc	ga	gc	gc	ct	gt	7825
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gc	ca	tg	tt	ta	tg	gc	gat	gg	at	gc	gag	tg	cat	ca	aa	ca	8005
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 <212> PRT
 <213> Bacillus licheniformis

<400> 8

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 20 25 30

Thr Ala Glu Tyr Val Glu Ile Lys Gly Pro Leu Asp Gln Glu Leu Phe
 35 40 45

Glu Lys Ala Leu Arg His Val Ile Lys Glu Ala Glu Ser Phe His Ala
 50 55 60

Arg Phe Gly Glu Asp Gln Asp Gly Pro Trp Gln Glu Ile Val Pro Ser
 65 70 75 80

Thr Asp Phe Pro Leu His Tyr Ile Asp Val Ser Ser Glu Thr Asp Pro
 85 90 95

Glu Gln Ala Ala Lys Ser Trp Met Met Asp Asp Leu Ala Arg Pro Val
 100 105 110

Asp Leu Thr Arg Gly Pro Leu Phe Thr Glu Ala Leu Phe Lys Ala Ala
 115 120 125

Gln Asp His Tyr Phe Trp Tyr Gln Arg Thr His His Ile Ala Thr Asp
 130 135 140

Gly Phe Ser Phe Thr Leu Ile Ala Glu Arg Leu Ser Lys Ile Tyr Thr
 145 150 155 160

Ala Leu Met Gln Asn Lys Ser Ile Asp Gln Ser Gly Ala Phe Gly Ser
 165 170 175

Leu Asp Leu Ile Leu Ala Glu Glu Thr Ala Tyr Arg Ala Ser Glu Gln
 180 185 190

Tyr Gln Glu Asp Arg Arg Phe Trp Leu Gly Arg Phe Ser Asp Glu Pro
 195 200 205

Glu Val Val Ser Leu Ala Glu Arg Ala Pro Arg Thr Ser Ser Ser Phe
 210 215 220

Leu Arg Arg Ser Glu His Leu Pro Ser Glu Asp Ala Asp Arg Leu Leu
 225 230 235 240

Ser Ala Ala Ser Arg Met Gly Ala Thr Trp His Glu Thr Val Met Ala
 Page 21

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245

250

255

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 260 265 270

Leu Gly Met Pro Met Met Cys Arg Leu Gly Ser Ala Ala Leu His Ile
 275 280 285

Pro Gly Met Val Met Asn Leu Leu Pro Leu Arg Ile Gly Met Gln Pro
 290 295 300

Gln Met Ser Ile Gly Glu Leu Val Lys Gln Ile Ser Gly Glu Met Met
 305 310 315 320

Lys Leu Arg Arg His Gln His Tyr Arg His Glu Glu Leu Arg Arg Asp
 325 330 335

Leu Lys Leu Leu Gly Glu Asn Gln Arg Leu Phe Gly Pro Gln Leu Asn
 340 345 350

Leu Met Pro Phe Glu Asn Arg Leu Asn Phe Ala Gly Cys Gln Gly Ile
 355 360 365

Val His Asn Leu Ala Thr Gly Pro Val Asp Asp Leu Ser Ile Asn Ile
 370 375 380

Tyr Gly Arg Pro Asp Gly Gly Gly Leu Lys Val Asn Met Asp Ala Asn
 385 390 395 400

Pro Ala Val Tyr His Ala Asp Glu Leu Glu Asp His Gly Asn Arg Phe
 405 410 415

Leu Thr Leu Leu Lys Thr Ile Ala Val Cys Glu Gln Thr Gln Pro Val
 420 425 430

Gly Thr Leu Asp Ile Leu Leu Pro Glu Glu Arg Ala Gln Ile Leu Ile
 435 440 445

Glu Trp Asn Gln Thr Glu His Gly Leu Pro Lys Glu Ser Leu Pro Gln
 450 455 460

Arg Phe Glu Arg Met Ala Lys Glu Cys Pro Glu Ser Pro Ala Val Val
 465 470 475 480

Cys Asn Asp Lys Val Leu Thr Tyr Ser Glu Leu Asn Gln Lys Ala Asn
 485 490 495

Gln Leu Ala His Leu Leu Ile Asp Gln Gly Ala Lys Pro Glu Thr Phe
 500 505 510

Ile Ala Leu Ala Leu Pro Arg Ser Ala Glu Met Val Val Ser Met Leu
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515

520

525

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 530 535 540

Pro Ala Asp Arg Ile Glu Tyr Met Leu Asn Asp Ala Gln Pro Leu Leu
 545 550 555 560

Val Met Thr Ser Lys Glu Ala Gln Asp Thr Ile Gly Ser Gln Met Pro
 565 570 575

Lys Leu Ile Leu Asp Glu Gln Thr Val Met Glu Lys Met Ser Gly Cys
 580 585 590

Ser Glu Glu Asn Pro Gly Glu Gln His Ser Gly Asn Gln Pro Ala Tyr
 595 600 605

Met Ile Tyr Thr Ser Gly Ser Thr Gly Arg Pro Lys Gly Val Val Val
 610 615 620

Gln Ala Glu Ser Leu Phe Asn Phe Leu Leu Ser Met Gln Asp Met Phe
 625 630 635 640

Ala Leu Asn Gln Asp Asp Arg Leu Leu Ala Val Thr Thr Ile Ala Phe
 645 650 655

Asp Ile Ser Ala Leu Glu Ile Tyr Leu Pro Leu Ile Ser Gly Ser Ala
 660 665 670

Val Val Leu Ala Glu Lys Glu Thr Val Gln Asp Pro Ser Glu Leu Ala
 675 680 685

Lys Met Ile Glu Thr Tyr Glu Ile Thr Ile Met Gln Ala Thr Pro Thr
 690 695 700

Leu Trp His Ala Leu Ala Ser Ser Ala Pro Glu Lys Leu Lys Gly Leu
 705 710 715 720

Arg Ala Leu Val Gly Gly Glu Ala Leu Gln Ser Ser Leu Ala Arg Gln
 725 730 735

Leu Gln Gln Leu Ala Cys Ser Leu Thr Asn Leu Tyr Gly Pro Thr Glu
 740 745 750

Thr Thr Ile Trp Ser Thr Ala Ala Ala Leu Glu Gly Asn Cys Thr Glu
 755 760 765

Pro Pro Gly Ile Gly Cys Ala Ile Trp Asn Thr Gln Leu Tyr Val Leu
 770 775 780

Asp Ala Gly Leu Gln Pro Val Pro Pro Gly Thr Ala Gly Glu Leu Tyr
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1055 1060 10297.204.ST25.txt 1065

Glu Gly Pro Ser Pro Thr Tyr Asn Ile Pro Val Val Val His Leu
1070 1075 1080

Thr Gly Asp Leu Asp Gln Lys Ala Leu Ala Ala Ala Leu Gly Asp
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Val Ala Thr Arg His Glu Pro Leu Arg Thr Ile Phe Pro Asp Gln
1100 1105 1110

Gln Gly Thr Thr His Gln Leu Ile Leu Glu Glu Asp Gln Ser Arg
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Pro Glu Leu Thr Val Ser His Val Ser Glu His Glu Leu Glu Lys
1130 1135 1140

Val Leu Ala Glu Ala Val Arg His Arg Tyr His Leu Glu Lys Glu
1145 1150 1155

Pro Pro Phe Arg Ala Gln Leu Phe Val Leu Gly Pro Asp Lys Phe
1160 1165 1170

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1190 1195 1200

Leu Gln Gly Glu Ala Pro Val Trp Glu Pro Leu Ser Ile Gln Tyr
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Ala Asp Tyr Ala Val Trp Gln Glu Tyr Leu Leu Gly Ser Glu Asn
1220 1225 1230

Asn Pro Asp Ser Leu Ile Ala Lys Gln Leu Glu Tyr Trp Ser Lys
1235 1240 1245

Ala Leu Glu His Leu Pro Asp Gln Leu Glu Leu Pro Thr Asp His
1250 1255 1260

Pro Arg Pro Ser Glu Ser Ser Tyr Arg Ser Gly Thr Ile Asp Leu
1265 1270 1275

Ser Ile Asp Glu Gln Leu His Gly Arg Leu Phe Asp Leu Ser Arg
1280 1285 1290

Ser Thr Gly Val Ser Met Phe Met Ile Leu Gln Ser Ala Leu Ala
1295 1300 1305

Ala Leu Leu Thr Arg Leu Gly Ala Gly His Asp Ile Pro Leu Gly

10297.204.ST25.txt

1310 1315 1320
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 1325 1330 1335
 Gly Leu Phe Val Asn Thr Leu Val Leu Arg Thr Asp Thr Ser Gly
 1340 1345 1350
 Asn Pro Ser Phe Arg Glu Leu Leu Asn Arg Val Arg Lys Val Asn
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 Leu Ala Ala Tyr Glu His Gln Asp Leu Pro Phe Glu Arg Leu Val
 1370 1375 1380
 Glu Val Leu Asn Pro Arg Arg Ser Arg Ala Arg His Pro Leu Phe
 1385 1390 1395
 Gln Ile Met Leu Ala Phe Gln Asn Thr Pro Glu Pro Glu Leu Asp
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 Ala Lys Phe Asp Leu Thr Ile Glu Leu Arg Glu His Arg Lys Ala
 1430 1435 1440
 Asp Gly Thr Pro Ala Gly Ile Gly Gly Phe Leu Glu Tyr Ser Thr
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 Asp Leu Phe Glu Arg Asn Thr Val Gln Thr Leu Ala Glu Arg Leu
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 Glu Lys Leu Asp Ile Leu Leu Pro Ala Glu Arg Glu Asn Met Leu
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 Pro Val Leu Phe Glu Lys Gln Ala Ala Lys Asp Pro Glu Ala Val
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 Lys Arg Ala Asn Arg Leu Ala His Leu Leu Ile Ala Lys Gly Val
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 Gly Pro Glu Gln Phe Ala Ala Leu Ala Leu Pro Arg Ser Leu Asp

10297.204.ST25.txt

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 Val Pro Leu Asp Pro Asp Tyr Pro Ala Glu Arg Ile Ala Phe Met
 1595 1600 1605
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 1610 1615 1620
 Glu Ser Asn Leu Ser Val Pro Gly Ser Val Glu Arg Ile Val Leu
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 1640 1645 1650
 Asn Pro Cys Asp Ala Asp Arg Thr Ala Pro Leu Leu Pro Leu His
 1655 1660 1665
 Pro Ala Tyr Val Ile Tyr Thr Ser Gly Ser Thr Gly Lys Pro Lys
 1670 1675 1680
 Gly Val Val Val Pro His Gln Asn Val Val Arg Leu Phe Gly Ala
 1685 1690 1695
 Thr Asp Gln Trp Phe His Phe Gly Ala Asp Asp Val Trp Thr Met
 1700 1705 1710
 Phe His Ser Tyr Ala Phe Asp Phe Ser Val Trp Glu Ile Trp Gly
 1715 1720 1725
 Ala Leu Leu Asn Gly Gly Arg Leu Ile Val Val Pro His Thr Ile
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 Ser Arg Ser Pro Ala Glu Phe Leu Asn Leu Leu Val Arg Glu Gly
 1745 1750 1755
 Val Thr Val Leu Asn Gln Thr Pro Ser Ala Phe Tyr Gln Leu Met
 1760 1765 1770
 Gln Ala Asp Arg Asp Asn Ala Glu Thr Gly Lys Leu Leu Ser Leu
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 Arg Phe Ile Ile Phe Gly Gly Glu Ala Leu Glu Leu Lys Arg Leu
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 1805 1810 1815
 Asn Met Tyr Gly Ile Thr Glu Thr Thr Val His Val Ser Tyr Ile

10297.204.ST25.txt

1820 1825 1830
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 Gly Gln Gly Ile Pro Asp Leu Gly Val Tyr Val Leu Asp Glu Tyr
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 Leu Glu Pro Val Pro Pro Gly Val Thr Gly Glu Met Tyr Val Ser
 1865 1870 1875
 Gly Gly Gly Leu Ala Arg Gly Tyr Leu Gly Arg Pro Asp Leu Thr
 1880 1885 1890
 Ala Asp Arg Phe Val Ala Asp Pro Phe Gly Pro Pro Gly Thr Arg
 1895 1900 1905
 Met Tyr Arg Thr Gly Asp Leu Ala Arg Arg Arg Gln Asp Gly Ser
 1910 1915 1920
 Leu Asp Tyr Met Gly Arg Ala Asp Gln Gln Ile Lys Ile Arg Gly
 1925 1930 1935
 Phe Arg Ile Glu Leu Gly Glu Ile Glu Ala Val Leu Val Arg His
 1940 1945 1950
 His Arg Val Asn Gln Ala Ala Val Val Val Arg Glu Gly Gln Pro
 1955 1960 1965
 Gly Asp Lys Arg Leu Ile Ala Tyr Val Val Pro Ala Ser Glu Glu
 1970 1975 1980
 Glu Thr Asp Pro Ala Glu Leu Arg Arg Phe Ala Ala Gly Thr Leu
 1985 1990 1995
 Pro Glu Tyr Met Val Pro Ser Ala Phe Val Lys Ile Ser Glu Leu
 2000 2005 2010
 Pro Leu Thr Pro Asn Gly Lys Leu Asp Arg Lys Ala Leu Pro Glu
 2015 2020 2025
 Pro Asp Phe Ala Ala Ala Val Lys Gly Arg Gly Pro Arg Thr Pro
 2030 2035 2040
 Gln Glu Glu Ile Leu Cys Asp Leu Phe Ser Glu Ile Leu Asn Ala
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 Pro Arg Val Gly Ile Asp Asp Gly Phe Phe Glu Leu Gly Gly His
 2060 2065 2070
 Ser Leu Leu Ala Val Gln Leu Met Ser Arg Ile Arg Glu Ala Leu

2075 2080 10297.204.ST25.txt 2085
 Gly Val Glu Leu Gly Ile Gly Asp Leu Leu Glu Ala Pro Thr Val
 2090 2095 2100
 Ser Gly Leu Ala Glu Arg Leu Glu Ser Gly Gly Arg Gln Ser Ala
 2105 2110 2115
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 2120 2125 2130
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 2135 2140 2145
 Gly Leu Met Thr Ala Leu Gly Lys Glu Tyr Pro Ile Tyr Gly Leu
 2150 2155 2160
 Gln Ala Arg Gly Ile Ala Arg Gln Glu Glu Leu Pro Asp Thr Leu
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 Asp Asp Met Ala Ala Asp Tyr Ile Arg His Ile Arg Thr Ile Gln
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 Pro Thr Gly Pro Tyr Arg Leu Leu Gly Trp Ser Leu Gly Gly Asn
 2195 2200 2205
 Val Val His Ala Ile Ala Thr Gln Leu Gln Glu Gln Gly Glu Asp
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 Ile Ser Leu Leu Val Met Leu Asp Ala Tyr Pro Asn His Phe Leu
 2225 2230 2235
 Pro Ile Lys Asp Ala Pro Asp Glu Gln Glu Ala Leu Ile Ala Leu
 2240 2245 2250
 Leu Ala Leu Gly Gly Tyr Asp Pro Asp Ser Leu Asp Gly Ala Pro
 2255 2260 2265
 Leu Asn Leu Ser Ser Ala Ile Asp Ile Leu Arg Arg Asp Gly Ser
 2270 2275 2280
 Ala Leu Ala Ser Leu Asp Glu Ala Ala Ile Leu Asn Leu Lys Glu
 2285 2290 2295
 Thr Tyr Val Asn Ser Val Arg Ile Leu Ser Glu Tyr Lys Pro Arg
 2300 2305 2310
 Val Phe His Gly Asp Ile Leu Phe Phe Lys Ser Thr Val Ile Pro
 2315 2320 2325
 Glu Trp Phe Asp Pro Ile Asp Pro Glu Ser Trp Leu Pro Tyr Leu

2335

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10297.204.ST25.txt

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Ile Asp His His His Leu Glu Arg Leu His Asp Val Ser Asp Gln Glu	
140 145 150 155	
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Leu Leu Glu Ala Ala Asp Gln Leu Arg Thr Leu Met Gly Glu Asn Ile	
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Phe Glu Leu Ile Phe Leu Pro Ala Leu Asp Glu Lys Thr Leu Pro Leu	
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Lys Pro Glu Val Ala Val Ala Lys Gly Ala Ala Lys Glu Ile Asn Leu	
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tta atc gga acc aaa ccc gtg atg aag gcg tct gtt ttt tcc tct gat	977
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 35 40 45

Ser Ile Asp Asp Ser Tyr Ser Ser Asn Leu Gly Leu Leu Asp Gln Ile
 50 55 60

Ala Ala Leu Glu Trp Val Lys Asp Asn Ile Ala Phe Phe Gly Gly Asp
 65 70 75 80

Arg His His Ile Thr Val Phe Gly Glu Ser Ala Gly Ser Met Ser Ile
 85 90 95

Ala Ser Leu Leu Ala Met Pro Lys Ala Lys Gly Leu Phe Gln Gln Ala
 100 105 110

Ile Met Glu Ser Gly Ala Ser Ala Thr Met Ser Asp Lys Leu Ala Lys
 115 120 125

10297.204.ST25.txt															
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Thr	Ser	Val	Asp	Thr	Gly	Asp	Ala	Leu	Ile	Ser	Val	Val	Glu	Pro	Gly
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His	Gly	Glu	Asp	Thr	Phe	Tyr	Ile	Ile	Tyr	Thr	Ser	Gly	Ser	Thr	Gly
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Asn	Pro	Lys	Gly	Val	Gln	Ile	Ser	Ala	Asp	Asn	Leu	Gln	Ser	Phe	Thr
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aat	caa	gcc	ccg	ttt	tcc	ttt	gat	tta	tcg	gta	atg	gac	ctt	tat	ccg
Asn	Gln	Ala	Pro	Phe	Ser	Phe	Asp	Leu	Ser	Val	Met	Asp	Leu	Tyr	Pro
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Cys	Leu	Gln	Ser	Gly	Gly	Thr	Leu	Trp	Thr	Val	Thr	Lys	Asp	Met	Ile
	205					210					215				
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Asn	Arg	Pro	Lys	Leu	Leu	Phe	Glu	Ala	Leu	Lys	Gln	Ser	Asn	Val	Asn
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gtc	tgg	aca	tcg	acg	cct	tca	ttc	gca	caa	atg	tgc	ttg	atg	gat	ccg
Val	Trp	Thr	Ser	Thr	Pro	Ser	Phe	Ala	Gln	Met	Cys	Leu	Met	Asp	Pro
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Ser	Tyr	Ser	Glu	Glu	Leu	Leu	Pro	Glu	Leu	Ser	Leu	Phe	Met	Phe	Cys
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Gly	Glu	Thr	Leu	Pro	Ala	Ser	Val	Ala	Arg	Gln	Leu	Lys	Glu	Arg	Phe
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Pro	Lys	Ala	Arg	Val	Phe	Asn	Thr	Tyr	Gly	Pro	Thr	Glu	Ala	Thr	Val
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10297.204.ST25.txt

Ser Leu Pro Val Gly Ser Glu Lys Pro Glu Thr Glu Ile Val Ile Ile
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 Asn Glu Asp Gly Lys Ala Val Gln Asp Gly Glu Lys Gly Glu Ile Ile
 335 340 345

att acc gga gca agc gtc agc aaa ggc tat tta ggc gaa aaa gcg ctg 1589
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 350 355 360

acg gaa aaa gcg ttt ttc tct tac aac ggc tcc cct gct tac cgc acc 1637
 Thr Glu Lys Ala Phe Phe Ser Tyr Asn Gly Ser Pro Ala Tyr Arg Thr
 365 370 375

ggg gac gca ggt tac aaa gaa aac ggc cag ctc ttc ttc ctc gga aga 1685
 Gly Asp Ala Gly Tyr Lys Glu Asn Gly Gln Leu Phe Phe Leu Gly Arg
 380 385 390

ctc gat ttc caa atc aaa ctg cac ggc tac cgg att gag ctt gaa gaa 1733
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 400 405 410

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 430 435 440

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 Val Pro Ala Glu His Asp Phe Glu Lys Glu Tyr Gln Leu Thr Ser Ala
 445 450 455

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 460 465 470 475

aaa ttc atg tat caa aaa gag att ccg atg aca gca aac ggt aaa atc 1973
 Lys Phe Met Tyr Gln Lys Glu Ile Pro Met Thr Ala Asn Gly Lys Ile
 480 485 490

gac cgc aag aga tta aaa gaa gag gta acc gta tgacgcctta tgggtcattt 2026
 Asp Arg Lys Arg Leu Lys Glu Glu Val Thr Val
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aaaagcttcc gcttatataa tatggcggtt tccgttctgg ttctggcgct tattttttcg 2146

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acccgcgacg gtctcattaa aaagcagctc ccaatcagca gactgcttta ctttattctc 2446

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10297.204.ST25.txt

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 35 40 45

Thr Asp Ala Ser Pro Ile Ile Val Tyr Gly His Met Lys Pro Val Met
 50 55 60

Ala Val Ser Phe Leu Ala Cys Val Lys Ala Gly His Pro Tyr Ile Pro
 65 70 75 80

Val Asp Val Ser Ile Pro Ala Asp Arg Ile Leu Lys Ile Ile Asn Ser
 85 90 95

Ser Lys Ala Glu Leu Leu Leu Asn Asn Ser Gly Thr Ser Val Asp Thr
 100 105 110

Gly Asp Ala Leu Ile Ser Val Val Glu Pro Gly Val Leu Glu Gly Asp
 115 120 125

Gly Val Pro Glu Thr Asp Pro Gly Arg Trp Val His Gly Glu Asp Thr
 130 135 140

Phe Tyr Ile Ile Tyr Thr Ser Gly Ser Thr Gly Asn Pro Lys Gly Val
 145 150 155 160

Gln Ile Ser Ala Asp Asn Leu Gln Ser Phe Thr Asp Trp Ile Thr Asn
 165 170 175

Asp Phe Pro Val Glu Ser Gly Gln Val Phe Leu Asn Gln Ala Pro Phe
 180 185 190

Ser Phe Asp Leu Ser Val Met Asp Leu Tyr Pro Cys Leu Gln Ser Gly
 195 200 205

Gly Thr Leu Trp Thr Val Thr Lys Asp Met Ile Asn Arg Pro Lys Leu
 210 215 220

Leu Phe Glu Ala Leu Lys Gln Ser Asn Val Asn Val Trp Thr Ser Thr
 225 230 235 240

Pro Ser Phe Ala Gln Met Cys Leu Met Asp Pro Ser Tyr Ser Glu Glu
 245 250 255

Leu Leu Pro Glu Leu Ser Leu Phe Met Phe Cys Gly Glu Thr Leu Pro
 Page 35

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265

260

270

Ala Ser Val Ala Arg Gln Leu Lys Glu Arg Phe Pro Lys Ala Arg Val
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Phe Asn Thr Tyr Gly Pro Thr Glu Ala Thr Val Ala Val Thr Ser Ile
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Glu Val Thr Asp Asp Val Leu Asn Lys Tyr Ser Ser Leu Pro Val Gly
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Ser Glu Lys Pro Glu Thr Glu Ile Val Ile Ile Asn Glu Asp Gly Lys
 325 330 335

Ala Val Gln Asp Gly Glu Lys Gly Glu Ile Ile Ile Thr Gly Ala Ser
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Val Ser Lys Gly Tyr Leu Gly Glu Lys Ala Leu Thr Glu Lys Ala Phe
 355 360 365

Phe Ser Tyr Asn Gly Ser Pro Ala Tyr Arg Thr Gly Asp Ala Gly Tyr
 370 375 380

Lys Glu Asn Gly Gln Leu Phe Phe Leu Gly Arg Leu Asp Phe Gln Ile
 385 390 395 400

Lys Leu His Gly Tyr Arg Ile Glu Leu Glu Glu Ile Glu Tyr Gln Ile
 405 410 415

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 420 425 430

Glu Glu Lys Ile Glu Tyr Leu Ile Ala Met Ile Val Pro Ala Glu His
 435 440 445

Asp Phe Glu Lys Glu Tyr Gln Leu Thr Ser Ala Ile Lys Lys Asp Leu
 450 455 460

Gly Ser Lys Leu Pro Ala Tyr Met Ile Pro Arg Lys Phe Met Tyr Gln
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10297.204.ST25.txt

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agataaagga ggaataaaga atg gga aac aca ttt tac ccg ctg aca cat gct	533
Met Gly Asn Thr Phe Tyr Pro Leu Thr His Ala	
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Gln Arg Arg Ile Trp Tyr Thr Glu Lys Phe Tyr Pro Gly Thr Ser Val	
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Ser Asn Leu Ser Gly Phe Gly Lys Leu Lys Ser Ala Ser Gly Ile Asp	
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Ser Gly Leu Leu Thr Glu Ala Ile Arg Lys Phe Val Arg Thr Asn Asp	
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Thr Met Arg Phe Arg Leu Met Phe Glu Gly Glu Asp Glu Pro Lys Gln	
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Tyr Ile Ala Glu Asp Glu Pro Phe Gln Ile Glu Tyr Phe Asp Ala Ser	
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Glu Ser Gly Gly Ala Asp Gly Val Leu Lys Trp Gly Gln Ala Glu Ala	
95 100 105	
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Val Arg Ile Ser Glu Glu Glu Ser Trp Phe Phe Ala Lys Val His His	
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160 165 170	
cag tca tca ttt acg gaa cat atc cag agc gaa ttg gag tat gaa aat	1061
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10297.204.ST25.txt

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Ile	Ser	Ile	His	Val	Lys	Glu	Arg	Trp	Asp	Thr	Gly	Thr	Leu	Ala	Ile					
					385					390					395					
gat	ttt	gat	tac	agg	gag	gag	ctt	ttt	act	tcg	gaa	gaa	atg	gcc	gtg	1733				
Asp	Phe	Asp	Tyr	Arg	Glu	Glu	Leu	Phe	Thr	Ser	Glu	Glu	Met	Ala	Val					
				400					405					410						
tta	tat	gaa	cgg	ctg	atg	acg	ctg	ctt	gaa	gat	gcc	ctg	ctg	tct	ccg	1781				
Leu	Tyr	Glu	Arg	Leu	Met	Thr	Leu	Leu	Glu	Asp	Ala	Leu	Leu	Ser	Pro					
			415				420						425							
caa	aaa	aca	atc	gct	gaa	ctg	gag	att	gtt	ccc	gct	ttt	gaa	aaa	gag	1829				
Gln	Lys	Thr	Ile	Ala	Glu	Leu	Glu	Ile	Val	Pro	Ala	Phe	Glu	Lys	Glu					
		430					435					440								
cgg	ctg	tta	aag	cgt	gca	tca	agc	caa	acc	att	gca	tat	gac	aag	aac	1877				
Arg	Leu	Leu	Lys	Arg	Ala	Ser	Ser	Gln	Thr	Ile	Ala	Tyr	Asp	Lys	Asn					

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445	450	455	
atg acc ctg cac ggt tta ttt gaa caa aaa gca gcc gat cat ccc gaa Met Thr Leu His Gly Leu Phe Glu Gln Lys Ala Ala Asp His Pro Glu 460 465 470 475			1925
aaa aca gcg gtt gta tat gaa gga caa aaa ctt tcg tac cgg gag ttg Lys Thr Ala Val Val Tyr Glu Gly Gln Lys Leu Ser Tyr Arg Glu Leu 480 485 490			1973
aat gaa caa tcg agc cgc ttg gca atg gcg ctt cgg aga aga ggc atc Asn Glu Gln Ser Ser Arg Leu Ala Met Ala Leu Arg Arg Arg Gly Ile 495 500 505			2021
ggg cct gat gct ccg gct gcg ata gtg atg gag cgg tca gag cgg gtc Gly Pro Asp Ala Pro Ala Ala Ile Val Met Glu Arg Ser Glu Arg Val 510 515 520			2069
atc acg gcg atg atg ggc gtt ttg aaa gcc ggc gga gct tat gta ccg Ile Thr Ala Met Met Gly Val Leu Lys Ala Gly Gly Ala Tyr Val Pro 525 530 535			2117
atc gat cct gga ttt ccg gaa gaa aga atc cgt ttt atg ctg gag gat Ile Asp Pro Gly Phe Pro Glu Glu Arg Ile Arg Phe Met Leu Glu Asp 540 545 550 555			2165
tca aag gcg aaa gcg gtt atc aca gac agc ggg ctg act ttt gaa acg Ser Lys Ala Lys Ala Val Ile Thr Asp Ser Gly Leu Thr Phe Glu Thr 560 565 570			2213
gct gaa acg gtg cag ttc agc gaa gcg ctt tct gaa tcg cgg gaa aac Ala Glu Thr Val Gln Phe Ser Glu Ala Leu Ser Glu Ser Arg Glu Asn 575 580 585			2261
ggc tat ccg tct tca gcg gca ggc gcc ggg cac ctt gca tac atc att Gly Tyr Pro Ser Ser Ala Ala Gly Ala Gly His Leu Ala Tyr Ile Ile 590 595 600			2309
tat act tcc ggt aca acg ggc cgt cca aaa ggc gtc atg att gaa cac Tyr Thr Ser Gly Thr Thr Gly Arg Pro Lys Gly Val Met Ile Glu His 605 610 615			2357
agg cag gtc cac cac ctt gtc aga gga ctt caa cag gcc gtt ggt aca Arg Gln Val His His Leu Val Arg Gly Leu Gln Ala Val Gly Thr 620 625 630 635			2405
tac gat cag gat gat ttg aaa ctg gcg ctt ctg gct cca ttt cat ttt Tyr Asp Gln Asp Asp Leu Lys Leu Ala Leu Leu Ala Pro Phe His Phe 640 645 650			2453
gat gct tcc gtt cag cag att ttt acg tct cta ttg ctc ggg caa acg Asp Ala Ser Val Gln Gln Ile Phe Thr Ser Leu Leu Leu Gly Gln Thr 655 660 665			2501
ttg tac atc gta ccg aaa aag acg gtt tcc gac gga cgc gct tta tcg Leu Tyr Ile Val Pro Lys Lys Thr Val Ser Asp Gly Arg Ala Leu Ser 670 675 680			2549
gat tat tac cgc cgg cat caa atc gat gtg aca gac ggt aca ccg gca Asp Tyr Tyr Arg Arg His Gln Ile Asp Val Thr Asp Gly Thr Pro Ala 685 690 695			2597
cat ttg cag ctt ttg gct gcg gct gat gat ctt tca ggc gtc aaa ttg His Leu Gln Leu Leu Ala Ala Ala Asp Asp Leu Ser Gly Val Lys Leu 700 705 710 715			2645
agg cat atg ctt gtt gga gga gag gct tta tca agg gtt gcg acg gaa Arg His Met Leu Val Gly Gly Glu Ala Leu Ser Arg Val Ala Thr Glu 720 725 730 735			2693

10297.204.ST25.txt

720	725	730	
agg ctg ctt cag tta ttt gca gaa aca gct gaa tcc gtg cct gct gtt Arg Leu Leu Gln Leu Phe Ala Glu Thr Ala Glu Ser Val Pro Ala Val 735 740 745			2741
acg aat gtt tac gga ccg acg gaa act tgt gtg gat gcc tct tct ttt Thr Asn Val Tyr Gly Pro Thr Glu Thr Cys Val Asp Ala Ser Ser Phe 750 755 760			2789
acg att aca aac cgc aca gat ctt caa tac gat acg gcc tat gta ccg Thr Ile Thr Asn Arg Thr Asp Leu Gln Tyr Asp Thr Ala Tyr Val Pro 765 770 775			2837
att ggc cgg ccg ata gga aat aac cgt ttt tat att ttg gat gaa aac Ile Gly Arg Pro Ile Gly Asn Asn Arg Phe Tyr Ile Leu Asp Glu Asn 780 785 790 795			2885
ggc gca ctc ctt cct gat ggc gtc gaa ggg gaa ttg tat att gca gga Gly Ala Leu Leu Pro Asp Gly Val Glu Gly Glu Leu Tyr Ile Ala Gly 800 805 810			2933
gac gga gtc ggg cga ggc tat ttg aac ttg cct gac atg acc aga gac Asp Gly Val Gly Arg Gly Tyr Leu Asn Leu Pro Asp Met Thr Arg Asp 815 820 825			2981
agg ttc ttg aaa gac ccg ttt gta tcc gga ggt ctc atg tat cga aca Arg Phe Leu Lys Asp Pro Phe Val Ser Gly Gly Leu Met Tyr Arg Thr 830 835 840			3029
ggg gat act gca cgt tgg ctt cct gac ggt aca gtt gat ttt atc ggc Gly Asp Thr Ala Arg Trp Leu Pro Asp Gly Thr Val Asp Phe Ile Gly 845 850 855			3077
cga aga gac gat caa gtg aaa atc cgc ggc ttc cgg atc gag ctt ggc Arg Arg Asp Asp Gln Val Lys Ile Arg Gly Phe Arg Ile Glu Leu Gly 860 865 870 875			3125
gag ata gag tcg gtg ctg caa gga gcc cct gct gtc gaa aaa gca gtt Glu Ile Glu Ser Val Leu Gln Gly Ala Pro Ala Val Glu Lys Ala Val 880 885 890			3173
gtc ctc gcg cgg cat gaa acc ggc ggc agc ctt gag gtt tgc gct tat Val Leu Ala Arg His Glu Thr Gly Gly Ser Leu Glu Val Cys Ala Tyr 895 900 905			3221
gtc gtt ccg aaa caa ggc gga aag att cac att cag gga ctg agg gag Val Val Pro Lys Gln Gly Gly Lys Ile His Ile Gln Gly Leu Arg Glu 910 915 920			3269
cac tta tcc aaa cac ctg cct gat tat atg atc cct tcc tgc ttt gtc His Leu Ser Lys His Leu Pro Asp Tyr Met Ile Pro Ser Cys Phe Val 925 930 935			3317
gag ctt aat gaa ata ccg ctg acg gca agc gga aaa gtc gac cgg aaa Glu Leu Asn Glu Ile Pro Leu Thr Ala Ser Gly Lys Val Asp Arg Lys 940 945 950 955			3365
gcg ctg ctt cgc cat gag gtg tct gtc agc ggg act gca gaa tat gcg Ala Leu Leu Arg His Glu Val Ser Val Ser Gly Thr Ala Glu Tyr Ala 960 965 970			3413
gcg ccg aga aat gaa tgt gaa gaa aaa atg gtg ggt ata tgg cag gaa Ala Pro Arg Asn Glu Cys Glu Glu Lys Met Val Gly Ile Trp Gln Glu 975 980 985			3461
gtg ctc gga gct gaa caa gtc gga atc cac gac cag ttt ttt gat ctg Val Leu Gly Ala Glu Gln Val Gly Ile His Asp Gln Phe Phe Asp Leu 990 995			3509

10297.204.ST25.txt															
990							995							1000	
ggc Gly	ggc Gly 1005	cac His	tct Ser	ctc Leu	aaa Lys	gcg Ala 1010	atg Met	acc Thr	atg Met	ctg Leu	gca Ala 1015	aaa Lys	att Ile	cat His	3554
aaa Lys	gct Ala 1020	ttc Phe	gga Gly	gtc Val	gaa Glu	gtt Val 1025	ccg Pro	ttg Leu	caa Gln	gtc Val	cta Leu 1030	ttt Phe	gaa Glu	aag Lys	3599
ccg Pro	aca Thr 1035	gta Val	gcg Ala	gcg Ala	ctg Leu	agc Ser 1040	ggc Gly	ttt Phe	gtt Val	tct Ser	gaa Glu 1045	gcc Ala	gag Glu	aaa Lys	3644
gac Asp	gga Gly 1050	ttc Phe	gcg Ala	gta Val	att Ile	gaa Glu 1055	ccg Pro	gcg Ala	ccg Pro	gaa Glu	agt Ser 1060	gac Asp	gat Asp	tat Tyr	3689
cct Pro	ctt Leu 1065	tca Ser	ttg Leu	gcg Ala	cag Gln	cag Gln 1070	cga Arg	atc Ile	tat Tyr	atc Ile	gtc Val 1075	agc Ser	cag Gln	ctg Leu	3734
gag Glu	ggt Gly 1080	gtc Val	ggc Gly	tac Tyr	aat Asn	atg Met 1085	ccg Pro	gcc Ala	gcg Ala	gcg Ala	atg Met 1090	ctt Leu	gaa Glu	ggc Gly	3779
act Thr	ctt Leu 1095	gac Asp	tct Ser	ggg Gly	cgc Arg	ctt Leu 1100	gaa Glu	gct Ala	gct Ala	ttt Phe	caa Gln 1105	aaa Lys	ctg Leu	att Ile	3824
gat Asp	agg Arg 1110	cat His	gag Glu	gcg Ala	ctg Leu	cgt Arg 1115	act Thr	tcg Ser	ttt Phe	aca Thr	gtt Val 1120	gtg Val	gat Asp	ggc Gly	3869
gag Glu	ccg Pro 1125	agg Arg	cag Gln	acc Thr	gtt Val	cat His 1130	caa Gln	agg Arg	gtt Val	cag Gln	ttc Phe 1135	aag Lys	att Ile	gag Glu	3914
aag Lys	gtt Val 1140	aag Lys	gcg Ala	gaa Glu	ggc Gly	aag Lys 1145	ccg Pro	atc Ile	gaa Glu	caa Gln	atc Ile 1150	gcg Ala	aaa Lys	tca Ser	3959
ttt Phe	gtc Val 1155	cgc Arg	cgc Arg	ttt Phe	gat Asp	ctc Leu 1160	gcc Ala	aaa Lys	gct Ala	ccg Pro	ctg Leu 1165	atg Met	aga Arg	gcg Ala	4004
ggt Gly	ctc Leu 1170	gtc Val	agc Ser	ctt Leu	gca Ala	gac Asp 1175	ggc Gly	aga Arg	cat His	ctg Leu	ctg Leu 1180	ttg Leu	ttc Phe	gat Asp	4049
atg Met	cat His 1185	cat His	ctc Leu	gta Val	tct Ser	gac Asp 1190	ggc Gly	gtg Val	tcg Ser	att Ile	tcg Ser 1195	atc Ile	ata Ile	ttg Leu	4094
aat Asn	gaa Glu 1200	ctg Leu	gcc Ala	gcg Ala	ctg Leu	tat Tyr 1205	aac Asn	ggg Gly	gag Glu	gaa Glu	ttg Leu 1210	ccg Pro	gag Glu	ctg Leu	4139
cgt Arg	ttg Leu 1215	cat His	tac Tyr	aaa Lys	gat Asp	tat Tyr 1220	gcc Ala	ttc Phe	tgg Trp	caa Gln	agg Arg 1225	gcg Ala	cag Gln	gca Ala	4184
caa Gln	gaa Glu 1230	ggc Gly	ttt Phe	caa Gln	aaa Lys	gaa Glu 1235	gag Glu	gcc Ala	tat Tyr	tgg Trp	gaa Glu 1240	agc Ser	atg Met	ttt Phe	4229
gcc Ala	ggc Gly	gag Glu	ctt Leu	ccc Pro	gta Val	ctg Leu	cag Gln	ctg Leu	atg Met	acg Thr	gac Asp	gag Glu	ccg Pro	agg Arg	4274

10297.204.ST25.txt															
1245						1250						1255			
ccg	cct	ggt	caa	agc	ttt	gaa	gga	gac	agg	gta	tcc	gca	gtc	ctg	4319
Pro	Pro	Val	Gln	Ser	Phe	Glu	Gly	Asp	Arg	Val	Ser	Ala	Val	Leu	
1260						1265						1270			
cca	aaa	gac	ctg	aaa	gaa	aaa	tta	gcc	gtg	ctg	gca	gag	caa	aac	4364
Pro	Lys	Asp	Leu	Lys	Glu	Lys	Leu	Ala	Val	Leu	Ala	Glu	Gln	Asn	
1275						1280						1285			
ggc	gcg	aca	ttg	tac	atg	gtc	atg	ctg	tct	gcg	tac	aac	atg	ctt	4409
Gly	Ala	Thr	Leu	Tyr	Met	Val	Met	Leu	Ser	Ala	Tyr	Asn	Met	Leu	
1290						1295						1300			
ctt	gca	aag	tac	tcc	ggg	cag	gaa	gat	gtg	atc	gtc	ggg	acg	ccg	4454
Leu	Ala	Lys	Tyr	Ser	Gly	Gln	Glu	Asp	Val	Ile	Val	Gly	Thr	Pro	
1305						1310						1315			
gcg	gcc	ggc	cgc	aga	cat	tcc	gat	ctg	gaa	gga	atc	atc	ggc	atg	4499
Ala	Ala	Gly	Arg	Arg	His	Ser	Asp	Leu	Glu	Gly	Ile	Ile	Gly	Met	
1320						1325						1330			
ttt	gtc	aat	acg	ctg	gcg	atc	cg	tca	aaa	gtg	gac	ccg	ggc	aga	4544
Phe	Val	Asn	Thr	Leu	Ala	Ile	Arg	Ser	Lys	Val	Asp	Pro	Gly	Arg	
1335						1340						1345			
acg	ttc	gca	gac	ttc	ctg	aat	gat	gta	aag	aaa	acg	gta	atc	gat	4589
Thr	Phe	Ala	Asp	Phe	Leu	Asn	Asp	Val	Lys	Lys	Thr	Val	Ile	Asp	
1350						1355						1360			
gct	ttt	gag	cat	cag	gat	tat	ccg	ttt	gag	cg	ctt	gcg	gag	aag	4634
Ala	Phe	Glu	His	Gln	Asp	Tyr	Pro	Phe	Glu	Arg	Leu	Ala	Glu	Lys	
1365						1370						1375			
ttt	ggc	gca	tcg	cg	gat	tta	agc	cg	cat	ccc	atc	ttt	gac	acg	4679
Phe	Gly	Ala	Ser	Arg	Asp	Leu	Ser	Arg	His	Pro	Ile	Phe	Asp	Thr	
1380						1385						1390			
atg	ttt	att	ttg	cag	aat	gca	tgg	gaa	gac	att	ccg	ctg	ctc	ggc	4724
Met	Phe	Ile	Leu	Gln	Asn	Ala	Trp	Glu	Asp	Ile	Pro	Leu	Leu	Gly	
1395						1400						1405			
gat	ttg	cac	ctc	tcg	att	tat	gaa	acg	aac	ttc	aat	att	gca	aaa	4769
Asp	Leu	His	Leu	Ser	Ile	Tyr	Glu	Thr	Asn	Phe	Asn	Ile	Ala	Lys	
1410						1415						1420			
ttc	gac	ttg	acg	ctg	cag	gca	aaa	gaa	gag	cag	gga	gaa	ttg	ata	4814
Phe	Asp	Leu	Thr	Leu	Gln	Ala	Lys	Glu	Glu	Gln	Gly	Glu	Leu	Ile	
1425						1430						1435			
ctc	gat	ttg	gat	tac	agc	acg	aag	ctg	ttt	aaa	aaa	gat	acg	gct	4859
Leu	Asp	Leu	Asp	Tyr	Ser	Thr	Lys	Leu	Phe	Lys	Lys	Asp	Thr	Ala	
1440						1445						1450			
gaa	agg	atg	ctg	aaa	gca	tac	ttg	aac	ctt	ctg	gag	gac	atg	gcg	4904
Glu	Arg	Met	Leu	Lys	Ala	Tyr	Leu	Asn	Leu	Leu	Glu	Asp	Met	Ala	
1455						1460						1465			
gct	gat	ccg	atg	ctc	agg	atc	ggc	gag	tac	agc	ctt	ttg	aca	gaa	4949
Ala	Asp	Pro	Met	Leu	Arg	Ile	Gly	Glu	Tyr	Ser	Leu	Leu	Thr	Glu	
1470						1475						1480			
gaa	gaa	acg	aat	cg	cag	ctc	gtc	gcg	ttc	aac	ccc	gcg	aca	agc	4994
Glu	Glu	Thr	Asn	Arg	Gln	Leu	Val	Ala	Phe	Asn	Pro	Ala	Thr	Ser	
1485						1490						1495			
gat	tat	ccg	cg	gag	aaa	acg	atc	gtt	cag	cta	ttc	gag	gaa	cag	5039
Asp	Tyr	Pro	Arg	Glu	Lys	Thr	Ile	Val	Gln	Leu	Phe	Glu	Glu	Gln	

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1500	1505	1510	
gct gca gaa aga ggc ggt tat Ala Ala Glu Arg Gly Gly Tyr 1515 1520	ccc gcc ctg caa ttt Pro Ala Leu Gln Phe 1525	gaa gac aaa Glu Asp Lys	5084
gta tgg tca tat gat gag ctc Val Trp Ser Tyr Asp Glu Leu 1530 1535	aat cgg aaa gcg aac Asn Arg Lys Ala Asn 1540	caa ttg gca Gln Leu Ala	5129
agg cgc ctc cgc gaa agt ggc Arg Arg Leu Arg Glu Ser Gly 1545 1550	gtg caa gcc ggc acg Val Gln Ala Gly Thr 1555	acg gcg gcc Thr Ala Ala	5174
att ctt acg gcc agg tcg gct Ile Leu Thr Ala Arg Ser Ala 1560 1565	gaa atg gtc atc ggc Glu Met Val Ile Gly 1570	att ctc gct Ile Leu Ala	5219
gtg ctg aaa gcc ggc ggg gct Val Leu Lys Ala Gly Gly Ala 1575 1580	tat gtg ccg atc gat Tyr Val Pro Ile Asp 1585	ccc gat cat Pro Asp His	5264
ccg gaa aag cgt gtg caa cat Pro Glu Lys Arg Val Gln His 1590 1595	ttc ttc aag gac agc Phe Phe Lys Asp Ser 1600	gga gcg gcg Gly Ala Ala	5309
gtt ctt tta acg caa aag gcg Val Leu Leu Thr Gln Lys Ala 1605 1610	atg aag ccg ctc gct Met Lys Pro Leu Ala 1615	gag gcg gcg Glu Ala Ala	5354
gaa ttt ggc ggc gac atc cta Glu Phe Gly Gly Asp Ile Leu 1620 1625	ttt gtt gag gat gaa Phe Val Glu Asp Glu 1630	aac ctt tat Asn Leu Tyr	5399
atg gga gat gcg tct gat ttg Met Gly Asp Ala Ser Asp Leu 1635 1640	cgc ctt ccg att tct Arg Leu Pro Ile Ser 1645	ccg gaa gca Pro Glu Ala	5444
atg gca aat cta acg tac aca Met Ala Asn Leu Thr Tyr Thr 1650 1655	tct gga acg aca ggg Ser Gly Thr Thr Gly 1660	acg ccg aag Thr Pro Lys	5489
ggc aat atg gtc tct cac cgg Gly Asn Met Val Ser His Arg 1665 1670	aat att ttg cgt act Asn Ile Leu Arg Thr 1675	gta aaa aac Val Lys Asn	5534
gcg aat tac ttg gaa gtg atg Ala Asn Tyr Leu Glu Val Met 1680 1685	gaa tcc gat atc gtt Glu Ser Asp Ile Val 1690	ctt tcg att Leu Ser Ile	5579
tca aat tat gtg ttc gac gcc Ser Asn Tyr Val Phe Asp Ala 1695 1700	ttt atg ttt gat gtg Phe Met Phe Asp Val 1705	ttc ggt tca Phe Gly Ser	5624
ttg ctg aac ggc gcc aag ctg Leu Leu Asn Gly Ala Lys Leu 1710 1715	gtg ata gct cca aaa Val Ile Ala Pro Lys 1720	gac acg att Asp Thr Ile	5669
ctt gat atg agc cgg ctc gca Leu Asp Met Ser Arg Leu Ala 1725 1730	cat gta ctc gaa aaa His Val Leu Glu Lys 1735	gaa aag att Glu Lys Ile	5714
acg att tta atg atc acg acc Thr Ile Leu Met Ile Thr Thr 1740 1745	gca tta ttc aat ctg Ala Leu Phe Asn Leu 1750	ctg aca gac Leu Thr Asp	5759
atg cgg ccg gac agt ttg aag Met Arg Pro Asp Ser Leu Lys	gga ctc cgc agg gtt Gly Leu Arg Arg Val	ctg ttc ggc Leu Phe Gly	5804

10297.204.ST25.txt															
1755							1760							1765	
ggc Gly	gaa Glu 1770	cgt Arg	gca Ala	tct Ser	gtc Val	gat Asp 1775	cat His	gtc Val	aga Arg	aga Arg	gcc Ala 1780	ctg Leu	aag Lys	aca Thr	5849
ggt Val	ggc Gly 1785	aga Arg	ggg Gly	cgg Arg	ctg Leu	ctt Leu 1790	cat His	atg Met	tac Tyr	ggt Gly	ccg Pro 1795	tct Ser	gag Glu	agc Ser	5894
acg Thr	gtc Val 1800	ttt Phe	aca Thr	acc Thr	tac Tyr	cat His 1805	cca Pro	gtc Val	aat Asn	gaa Glu	gtg Val 1810	ccg Pro	gac Asp	gat Asp	5939
gcg Ala	cag Gln 1815	gct Ala	ata Ile	ccg Pro	atc Ile	gga Gly 1820	aag Lys	cct Pro	gtc Val	agc Ser	aat Asn 1825	acg Thr	gag Glu	gtt Val	5984
ctg Leu	att Ile 1830	ctt Leu	gat Asp	tca Ser	ttc Phe	ggc Gly 1835	aat Asn	gta Val	cag Gln	ccg Pro	gca Ala 1840	ggg Gly	gtt Val	gcg Ala	6029
gga Gly	gaa Glu 1845	tta Leu	tgc Cys	gtc Val	ggc Gly	gga Gly 1850	gac Asp	ggc Gly	ctt Leu	gtc Val	cgc Arg 1855	ggc Gly	tat Tyr	ttt Phe	6074
aac Asn	cgc Arg 1860	cct Pro	gaa Glu	ctg Leu	acg Thr	gct Ala 1865	gaa Glu	aag Lys	ttt Phe	acg Thr	gcg Ala 1870	cat His	ccg Pro	ttc Phe	6119
aaa Lys	acc Thr 1875	ggc Gly	gaa Glu	aag Lys	att Ile	tac Tyr 1880	cgg Arg	acg Thr	ggt Gly	gat Asp	atg Met 1885	gcg Ala	aga Arg	tgg Trp	6164
ctt Leu	gcc Ala 1890	gac Asp	gga Gly	tgc Cys	ctc Leu	gaa Glu 1895	ttt Phe	atc Ile	ggt Gly	cgg Arg	att Ile 1900	gat Asp	cat His	cag Gln	6209
gtc Val	aaa Lys 1905	att Ile	cgc Arg	gga Gly	cag Gln	aga Arg 1910	atc Ile	gag Glu	ctg Leu	ggc Gly	gaa Glu 1915	atc Ile	gag Glu	cat His	6254
cat His	ctc Leu 1920	cta Leu	acg Thr	cat His	gac Asp	atg Met 1925	gtt Val	cag Gln	gaa Glu	gcc Ala	gct Ala 1930	gtt Val	ctt Leu	gct Ala	6299
gtt Val	gac Asp 1935	acc Thr	ggg Gly	gcg Ala	gga Gly	gat Asp 1940	caa Gln	atg Met	atc Ile	tgt Cys	gca Ala 1945	tac Tyr	ttt Phe	acg Thr	6344
gct Ala	gat Asp 1950	cag Gln	gag Glu	ctt Leu	tcg Ser	agc Ser 1955	caa Gln	gag Glu	ctt Leu	cgc Arg	cga Arg 1960	cat His	gcg Ala	gca Ala	6389
gaa Glu	ggt Gly 1965	ctg Leu	cca Pro	ggc Gly	tat Tyr	atg Met 1970	atc Ile	ccg Pro	tct Ser	gtg Val	ttt Phe 1975	atg Met	cag Gln	ctt Leu	6434
gat Asp	gag Glu 1980	ctt Leu	ccg Pro	ctc Leu	aca Thr	ggc Gly 1985	aat Asn	gga Gly	aag Lys	atc Ile	gac Asp 1990	aga Arg	agg Arg	gcg Ala	6479
ctg Leu	cct Pro 1995	gaa Glu	ccg Pro	gat Asp	atc Ile	gcg Ala 2000	cag Gln	gcc Ala	gcg Ala	caa Gln	aag Lys 2005	gaa Glu	tat Tyr	acg Thr	6524
gcg Ala	cca Pro	agg Arg	agc Ser	ggc Gly	aca Thr	gaa Glu	gcg Ala	cag Gln	ctt Leu	gcc Ala	gat Asp	ctt Leu	tgg Trp	cag Gln	6569

10297.204.ST25.txt

2010						2015					2020					
gag Glu	gtg Val 2025	ctc Leu	aat Asn	gta Val	ccg Pro	aaa Lys 2030	atc Ile	ggt Gly	gtg Val	cat His	gac Asp 2035	aat Asn	ttt Phe	ttt Phe	6614	
gaa Glu	ctc Leu 2040	ggc Gly	gga Gly	cac His	tct Ser	tta Leu 2045	ctc Leu	gga Gly	atg Met	acg Thr	ctc Leu 2050	atc Ile	gcc Ala	cgc Arg	6659	
atc Ile	cag Gln 2055	caa Gln	gag Glu	atg Met	aat Asn	gtt Val 2060	gac Asp	ctg Leu	cag Gln	ctg Leu	aaa Lys 2065	gac Asp	ttg Leu	ttc Phe	6704	
cag Gln	gcg Ala 2070	ccg Pro	aca Thr	atc Ile	gaa Glu	agc Ser 2075	ctg Leu	gcc Ala	cag Gln	gcg Ala	gcg Ala 2080	gca Ala	aaa Lys	tct Ser	6749	
gag Glu	aaa Lys 2085	aaa Lys	tct Ser	gcc Ala	gtt Val	tat Tyr 2090	att Ile	gaa Glu	gcg Ala	gcg Ala	ccg Pro 2095	gac Asp	cgg Arg	gaa Glu	6794	
acg Thr	tac Tyr 2100	ccc Pro	gtt Val	tcg Ser	tcg Ser	gcg Ala 2105	caa Gln	aaa Lys	cgg Arg	ctg Leu	tac Tyr 2110	gtt Val	ctt Leu	cag Gln	6839	
cag Gln	att Ile 2115	gaa Glu	ggc Gly	gct Ala	gag Glu	aaa Lys 2120	agc Ser	tat Tyr	aac Asn	atg Met	ccg Pro 2125	gcc Ala	gtt Val	ctc Leu	6884	
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ctg Leu	att Ile 2190	aaa Lys	gag Glu	ttc Phe	atc Ile	agg Arg 2195	ccg Pro	ttt Phe	gat Asp	tta Leu	aca Thr 2200	aag Lys	gct Ala	ccg Pro	7109	
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ctt Leu	gaa Glu 2250	ccg Pro	ctg Leu	agg Arg	att Ile	cag Gln 2255	tat Tyr	aaa Lys	gac Asp	tat Tyr	gct Ala 2260	gta Val	tgg Trp	cag Gln	7289	
cag Gln	cac His	ttg Leu	ctc Leu	act Thr	gaa Glu	cgg Arg	cac His	aaa Lys	atg Met	cag Gln	gag Glu	gaa Glu	tac Tyr	tgg Trp	7334	

10297.204.ST25.txt															
2265						2270						2275			
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gac Asp	tat Tyr 2295	ccg Pro	cgt Arg	cct Pro	tct Ser	gtt Val 2300	caa Gln	acg Thr	ttt Phe	gaa Glu	gga Gly 2305	agc Ser	cgt Arg	atc Ile	7424
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gcc Ala	aag Lys 2325	gaa Glu	acg Thr	gaa Glu	agc Ser	act Thr 2330	tta Leu	tac Tyr	atg Met	gtg Val	ctc Leu 2335	gct Ala	gcc Ala	tca Ser	7514
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atc Ile	atc Ile 2370	ggc Gly	atg Met	ttt Phe	gtc Val	aat Asn 2375	acg Thr	ctt Leu	gcg Ala	ata Ile	aga Arg 2380	acg Thr	cgt Arg	cct Pro	7649
gaa Glu	gga Gly 2385	gac Asp	aag Lys	ccg Pro	ttt Phe	tct Ser 2390	gca Ala	ttc Phe	ctt Leu	gag Glu	gaa Glu 2395	gta Val	aaa Lys	gaa Glu	7694
acg Thr	acg Thr 2400	ctc Leu	ggc Gly	gca Ala	ttt Phe	gag Glu 2405	cat His	caa Gln	gat Asp	tac Tyr	ccg Pro 2410	ttt Phe	gaa Glu	gaa Glu	7739
ctg Leu	atc Ile 2415	gag Glu	aag Lys	ctg Leu	aac Asn	atc Ile 2420	cag Gln	cgc Arg	gac Asp	atg Met	agc Ser 2425	cga Arg	aac Asn	ccg Pro	7784
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cgc Arg	gaa Glu 2490	tcg Ser	atc Ile	aaa Lys	cgc Arg	tgg Trp 2495	agc Ser	ggg Gly	tac Tyr	tgg Trp	gtc Val 2500	aac Asn	ctg Leu	ctc Leu	8009
gaa Glu	gcg Ala 2505	gtt Val	gcc Ala	gaa Glu	acc Thr	ccg Pro 2510	gat Asp	gca Ala	agt Ser	ctt Leu	tca Ser 2515	gac Asp	ctt Leu	tcg Ser	8054
ctt Leu	ctg Leu	gat Asp	gaa Glu	gcg Ala	gaa Glu	aaa Lys	cgg Arg	cgg Arg	atc Ile	gtc Val	caa Gln	aag Lys	tgg Trp	aat Asn	8099

10297.204.ST25.txt															
2520							2530								
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ttc Phe	gaa Glu 2550	gcg Ala	caa Gln	gtc Val	ctc Leu	cgc Arg 2555	act Thr	cct Pro	gac Asp	cgc Arg	ggg Gly 2560	gca Ala	gcg Ala	gtg Val	8189
tac Tyr	aac Asn 2565	ggc Gly	gtg Val	aag Lys	tgg Trp	acg Thr 2570	tac Tyr	aaa Lys	gag Glu	ctg Leu	aac Asn 2575	gcg Ala	cgc Arg	gcc Ala	8234
aac Asn	cgt Arg 2580	ctg Leu	gcc Ala	cgc Arg	ctg Leu	ctg Leu 2585	att Ile	gaa Glu	aaa Lys	gga Gly	gcc Ala 2590	ggt Gly	cct Pro	gag Glu	8279
cag Gln	cgg Arg 2595	gtc Val	gga Gly	atc Ile	atg Met	gtg Val 2600	aag Lys	cct Pro	tcg Ser	ctg Leu	gaa Glu 2605	atg Met	gcg Ala	gcc Ala	8324
ggc Gly	gta Val 2610	ctt Leu	gcg Ala	att Ile	ttg Leu	aaa Lys 2615	gcg Ala	gga Gly	gcg Ala	gcc Ala	tat Tyr 2620	gta Val	ccg Pro	atc Ile	8369
gat Asp	ccc Pro 2625	ggc Gly	tat Tyr	ccg Pro	gcc Ala	gag Glu 2630	cgg Arg	atc Ile	gga Gly	tac Tyr	gta Val 2635	ctg Leu	aaa Lys	gac Asp	8414
agc Ser	ggt Gly 2640	gca Ala	gaa Glu	ctg Leu	ctt Leu	ctg Leu 2645	acg Thr	caa Gln	aca Thr	aac Asn	tta Leu 2650	gcc Ala	gta Val	cct Pro	8459
gaa Glu	gaa Glu 2655	ttc Phe	agc Ser	ggt Gly	gaa Glu	acg Thr 2660	ctt Leu	ctt Leu	ctc Leu	gat Asp	tcg Ser 2665	atg Met	ctg Leu	agc Ser	8504
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cag Gln	cca Pro 2685	aac Asn	aac Asn	ctg Leu	gca Ala	tac Tyr 2690	ttg Leu	att Ile	tac Tyr	aca Thr	tcg Ser 2695	ggc Gly	acg Thr	aca Thr	8594
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gat Asp	gaa Glu 2760	gcg Ala	atc Ile	cgg Arg	atg Met	gac Asp 2765	att Ile	acg Thr	cgt Arg	ttg Leu	aat Asn 2770	gaa Glu	tat Tyr	ttc Phe	8819
gaa Glu	gag Glu	aac Asn	gga Gly	ata Ile	acg Thr	atc Ile	acg Thr	ttc Phe	ctg Leu	ccg Pro	aca Thr	cag Gln	ctg Leu	tgc Cys	8864

10297.204.ST25.txt

2775	2780	2785	
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aag Lys 2810	cgg atc gaa aaa Arg Ile Glu Lys	cgg Arg 2815	
ctc Leu	gtc Val 2820	aac aac tat ggg Asn Asn Tyr Gly	8999
ccg Pro 2825	acg gaa aac aca Thr Glu Asn Thr	gtc Val 2830	
agc Ser	aca Thr 2835	gca atc gat cct Ala Ile Asp Pro	9044
gat Asp 2840	gaa ggc atg ctt Glu Gly Met Leu	tcg Ser 2845	
ccg Pro	att Ile 2850	gct aat acg cgg Ala Asn Thr Arg	9089
gcg Ala 2855	tat gtg ctt gga Tyr Val Leu Gly	caa Gln 2860	
gtt Val	cag Gln 2865	cct gtc ggc gtc Pro Val Gly Val	9134
gct Ala 2870	ggc gag ctg tgc Gly Glu Leu Cys	atc Ile 2875	
ggg Gly	ctt Leu 2880	gcg cgc ggc tat Ala Arg Gly Tyr	9179
ctg Leu 2885	aac aag ccg gag Asn Lys Pro Glu	gaa Glu 2890	
cgt Arg	ttt Phe 2895	acg gaa gac ccg Thr Glu Asp Pro	9224
ttt Phe 2900	gtg ccg ggc gag Val Pro Gly Glu	cgc Arg 2905	
aca Thr	ggg Gly 2910	gat gcg gtc aaa Asp Ala Val Lys	9269
tgg Trp 2915	ctg gaa gac ggg Leu Glu Asp Gly	cgg Arg 2920	
atc Ile	ggc Gly 2925	cgg atc gac cag Arg Ile Asp Gln	9314
cag Gln 2930	gtg aaa atc cgc Val Lys Ile Arg	ggc Gly 2935	
gag Glu	ctt Leu 2940	tct gaa att gaa Ser Glu Ile Glu	9359
gtc Val 2945	cag ctc gcg cgg Gln Leu Ala Arg	ctc Leu 2950	
cag Gln 2955	gaa gac gac gcc Glu Glu Asp Ala	tac Tyr 2965	9404
gac Asp 2960	atc gaa gac gcc Ile Glu Asp Ala	tac Tyr 2965	
gcg Ala	ctg Leu 2970	tgc ggc tat gtc Cys Gly Tyr Val	9449
gtt Val 2975	gcg gac gaa cag Ala Asp Glu Gln	ctt Leu 2980	
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ggg Gly 2990	cag acg ctt ccg Gln Thr Leu Pro	gac Asp 2995	
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ctt Leu 3005	gat gag ctt ccg Asp Glu Leu Pro	gtt Val 3010	
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cag Gln	aca Thr	gaa acg Glu Thr	9629
gcc Ala	gaa Glu	tac Tyr	
aaa Lys	aaa Lys	gcg Ala	
ccg Pro	cgc Arg	aca Thr	
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10297.204.ST25.txt

3030	3035	3040	
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atg aag gac ttg ttt cag cac Met Lys Asp Leu Phe Gln His 3090 3095	ccg acg atc ggg gag Pro Thr Ile Gly Glu 3100	ctc agt gct Leu Ser Ala	9809
tat gtt caa gcg gct gac gat Tyr Val Gln Ala Ala Asp Asp 3105 3110	cag ccg atc gat cag Gln Pro Ile Asp Gln 3115	aac cct gtc Asn Pro Val	9854
gaa ggc gaa gtc aca ctg acg Glu Gly Glu Val Thr Leu Thr 3120 3125	ccg atc cag cgc tgg Pro Ile Gln Arg Trp 3130	ttc ttt gag Phe Phe Glu	9899
cgc aaa ttt acg aac gag cat Arg Lys Phe Thr Asn Glu His 3135 3140	cat tgg aac caa tca His Trp Asn Gln Ser 3145	gtt atg ctt Val Met Leu	9944
cac gcc cct tca ggg ttt gac His Ala Pro Ser Gly Phe Asp 3150 3155	ccg gaa gcg gca ggc Pro Glu Ala Ala Gly 3160	aag gct tta Lys Ala Leu	9989
acc aag atg atc gaa cac cat Thr Lys Met Ile Glu His His 3165 3170	gat gca ctt cgc atg Asp Ala Leu Arg Met 3175	gtt tat cag Val Tyr Gln	10034
cga aat gga gac ggg att gtt Arg Asn Gly Asp Gly Ile Val 3180 3185	cag tac aac aga ggg Gln Tyr Asn Arg Gly 3190	ctg gaa gaa Leu Glu Glu	10079
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gcc ggg tac gcc caa gct gaa Ala Gly Tyr Ala Gln Ala Glu 3270 3275	aaa ggg gag ccg atc Lys Gly Glu Pro Ile 3280	att ctt caa Ile Leu Gln	10349
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10297.204.ST25.txt

3285	3290	3295	
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Tyr Ala Arg Ser Lys Ala Phe Ala Lys Glu Ile Gly Tyr Trp Gln			
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Glu Val Glu Lys Ala Glu Thr Ala Ser Leu Pro Lys Asp Asp Glu			
3315	3320	3325	
gca gag gac aaa cgg atg cac cat acg aaa acg gct gag ttt tct			10529
Ala Glu Asp Lys Arg Met His His Thr Lys Thr Ala Glu Phe Ser			
3330	3335	3340	
ctc tcg aaa gaa gaa aca gaa cag ttg atg aca aaa gtt cat gaa			10574
Leu Ser Lys Glu Glu Thr Glu Gln Leu Met Thr Lys Val His Glu			
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Ser Arg Thr Val Gly Trp Phe Thr Ser Gln Phe Pro Ala Leu Ile			
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Gln Leu Arg His Ser Glu Asp Ile Gly Tyr Gln Ile Lys Gln Ile			
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Lys Glu Glu Leu Arg His Ile Pro Asn Lys Gly Ile Gly Tyr Gly			
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Ile Tyr Arg Tyr Leu Thr Glu Glu Gly Lys Lys Ala Gln Pro Ile			
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Pro Leu Ser Pro Glu Thr Glu Lys Pro Asn Ala Leu Asp Ile Val			
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Gly Tyr Ile Glu Asn Gly Ile Leu Thr Met Ser Ile Ala Tyr His			
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Ser Leu Glu Tyr Lys Glu Ser Thr Val Ala Ala Val Ala Ala Ser			
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Phe Lys Thr Tyr Leu Leu Gln Leu Ile Asp His Cys Leu Glu Leu			

10297.204.ST25.txt

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Thr Leu Glu Glu Leu Asp Lys Leu Met Glu Ile Phe
3570          3575          3580

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<210> 14
 <211> 3580
 <212> PRT
 <213> Bacillus licheniformis

<400> 14

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Phe Gly Lys Leu Lys Ser Ala Ser Gly Ile Asp Ser Gly Leu Leu Thr
35          40          45

Glu Ala Ile Arg Lys Phe Val Arg Thr Asn Asp Thr Met Arg Phe Arg
50          55          60

Leu Met Phe Glu Gly Glu Asp Glu Pro Lys Gln Tyr Ile Ala Glu Asp
65          70          75          80

Glu Pro Phe Gln Ile Glu Tyr Phe Asp Ala Ser Glu Ser Gly Gly Ala
85          90          95

Asp Gly Val Leu Lys Trp Gly Gln Ala Glu Ala Arg Arg Pro Leu Pro
100          105          110

Leu Tyr Asp Ser Pro Leu Phe Lys Phe Ala Val Val Arg Ile Ser Glu
115          120          125

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10297.204.ST25.txt

Glu Glu Ser Trp Phe Phe Ala Lys Val His His Ile Ile Ser Asp Gly
 130 135 140

Ile Ser Met Thr Ile Leu Gly Asn Arg Ile Thr Asp Ile Tyr Leu Lys
 145 150 155 160

Leu Ala Lys Gly Glu Thr Asp Leu Glu Pro Val Gln Ser Ser Phe Thr
 165 170 175

Glu His Ile Gln Ser Glu Leu Glu Tyr Glu Asn Ser Lys Arg Phe Gln
 180 185 190

Lys Asp Lys Ala Tyr Trp Asn Ala Gln Tyr Glu Ala Ile Pro Glu Pro
 195 200 205

Val Ser Leu Lys Ala Ser Asp Thr Tyr Gln Ile Gln Leu Asp Ala Ala
 210 215 220

Arg Phe Ser Lys Glu Ile Ser Pro Asp Leu Tyr Lys Lys Ile Gln Thr
 225 230 235 240

Tyr Cys Asn Glu His Asn Ile Ser Val Leu Ser Leu Phe Leu Ser Ile
 245 250 255

Leu His Ile Tyr Met His Arg Val Thr Gly Gln Lys Asp Val Val Leu
 260 265 270

Gly Thr Phe Met Gly Asn Arg Thr Asn Ala Lys Glu Lys Gln Met Leu
 275 280 285

Gly Met Phe Val Ser Thr Ile Pro Met Lys Ala Ser Ile Glu Val His
 290 295 300

Gln Asp Phe Ser Ala Phe Val Gln Glu Arg Met Lys Asp Gln Leu Lys
 305 310 315 320

Ile Ile Arg His Gln Lys Tyr Pro Tyr Asn Leu Leu Ile Asn Asp Leu
 325 330 335

Arg Glu Arg Gln Pro His Val Ser Lys Leu Phe Ala Val Ser Leu Glu
 340 345 350

Tyr Gln Val Met Gln Trp Gln Gln Lys Glu Thr Val Ser Phe Leu Thr
 355 360 365

Glu Pro Ile Phe Ser Gly Ser Glu Val Asn Asp Ile Ser Ile His Val
 370 375 380

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 385 390 395 400

10297.204.ST25.txt

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420 425 430

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435 440 445

Ala Ser Ser Gln Thr Ile Ala Tyr Asp Lys Asn Met Thr Leu His Gly
450 455 460

Leu Phe Glu Gln Lys Ala Ala Asp His Pro Glu Lys Thr Ala Val Val
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Tyr Glu Gly Gln Lys Leu Ser Tyr Arg Glu Leu Asn Glu Gln Ser Ser
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Ala Ala Ile Val Met Glu Arg Ser Glu Arg Val Ile Thr Ala Met Met
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Gly Val Leu Lys Ala Gly Gly Ala Tyr Val Pro Ile Asp Pro Gly Phe
530 535 540

Pro Glu Glu Arg Ile Arg Phe Met Leu Glu Asp Ser Lys Ala Lys Ala
545 550 555 560

Val Ile Thr Asp Ser Gly Leu Thr Phe Glu Thr Ala Glu Thr Val Gln
565 570 575

Phe Ser Glu Ala Leu Ser Glu Ser Arg Glu Asn Gly Tyr Pro Ser Ser
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Ala Ala Gly Ala Gly His Leu Ala Tyr Ile Ile Tyr Thr Ser Gly Thr
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Thr Gly Arg Pro Lys Gly Val Met Ile Glu His Arg Gln Val His His
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Leu Val Arg Gly Leu Gln Gln Ala Val Gly Thr Tyr Asp Gln Asp Asp
625 630 635 640

Leu Lys Leu Ala Leu Leu Ala Pro Phe His Phe Asp Ala Ser Val Gln
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Gln Ile Phe Thr Ser Leu Leu Leu Gly Gln Thr Leu Tyr Ile Val Pro
660 665 670

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Lys Lys Thr Val Ser Asp Gly Arg Ala Leu Ser Asp Tyr Tyr Arg Arg
 675 680 685

His Gln Ile Asp Val Thr Asp Gly Thr Pro Ala His Leu Gln Leu Leu
 690 695 700

Ala Ala Ala Asp Asp Leu Ser Gly Val Lys Leu Arg His Met Leu Val
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Gly Gly Glu Ala Leu Ser Arg Val Ala Thr Glu Arg Leu Leu Gln Leu
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Phe Ala Glu Thr Ala Glu Ser Val Pro Ala Val Thr Asn Val Tyr Gly
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Pro Thr Glu Thr Cys Val Asp Ala Ser Ser Phe Thr Ile Thr Asn Arg
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Thr Asp Leu Gln Tyr Asp Thr Ala Tyr Val Pro Ile Gly Arg Pro Ile
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Gly Asn Asn Arg Phe Tyr Ile Leu Asp Glu Asn Gly Ala Leu Leu Pro
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Asp Gly Val Glu Gly Glu Leu Tyr Ile Ala Gly Asp Gly Val Gly Arg
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Gly Tyr Leu Asn Leu Pro Asp Met Thr Arg Asp Arg Phe Leu Lys Asp
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 Gln Val Gly Ile His Asp Gln Phe Phe Asp Leu Gly Gly His Ser Leu
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 Lys Ala Met Thr Met Leu Ala Lys Ile His Lys Ala Phe Gly Val
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Gly Tyr Pro Ala Leu Gln Phe Glu Asp Lys Val Trp Ser Tyr Asp
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Glu Leu Asn Arg Lys Ala Asn Gln Leu Ala Arg Arg Leu Arg Glu
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Ser Gly Val Gln Ala Gly Thr Thr Ala Ala Ile Leu Thr Ala Arg
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Gly Ala Tyr Val Pro Ile Asp Pro Asp His Pro Glu Lys Arg Val
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 1790 1800
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 Gly Gly Asp Gly Leu Val Arg Gly Tyr Phe Asn Arg Pro Glu Leu
 1850 1855 1860
 Thr Ala Glu Lys Phe Thr Ala His Pro Phe Lys Thr Gly Glu Lys
 1865 1870 1875
 Ile Tyr Arg Thr Gly Asp Met Ala Arg Trp Leu Ala Asp Gly Cys
 1880 1885 1890
 Leu Glu Phe Ile Gly Arg Ile Asp His Gln Val Lys Ile Arg Gly
 1895 1900 1905
 Gln Arg Ile Glu Leu Gly Glu Ile Glu His His Leu Leu Thr His
 1910 1915 1920
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 1940 1945 1950
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 1985 1990 1995

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 2015 2020 2025

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Asn Val Asp Leu Gln Leu Lys Asp Leu Phe Gln Ala Pro Thr Ile
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Glu Ser Leu Ala Gln Ala Ala Ala Lys Ser Glu Lys Lys Ser Ala
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10297.204.ST25.txt

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Ser Lys Leu Ser Gly Gln Ser Glu Val Ile Phe Gly Ser Pro Ala
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Glu Lys 2525	Arg Arg Ile Val	Gln 2530	Lys Trp Asn Glu	Thr 2535	Lys Leu Ala
Val Pro 2540	Gln Asp Lys Thr	Val 2545	His Glu Leu Phe	Glu 2550	Ala Gln Val
Leu Arg 2555	Thr Pro Asp Arg	Gly 2560	Ala Ala Val Tyr	Asn 2565	Gly Val Lys
Trp Thr 2570	Tyr Lys Glu Leu	Asn 2575	Ala Arg Ala Asn	Arg 2580	Leu Ala Arg
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Ala Glu 2630	Arg Ile Gly Tyr	Val 2635	Leu Lys Asp Ser	Gly 2640	Ala Glu Leu
Leu Leu 2645	Thr Gln Thr Asn	Leu 2650	Ala Val Pro Glu	Glu 2655	Phe Ser Gly
Glu Thr 2660	Leu Leu Leu Asp	Ser 2665	Met Leu Ser Glu	Glu 2670	Ile Thr Asn
Asp Asp 2675	Glu Val Asn Pro	Gln 2680	Ala Gly Thr Gln	Pro 2685	Asn Asn Leu
Ala Tyr 2690	Leu Ile Tyr Thr	Ser 2695	Gly Thr Thr Gly	Gln 2700	Pro Lys Gly
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Asn Asp 2720	Ala Phe Ala Val	Thr 2725	Glu Gln Asp Lys	Ser 2730	Ala Lys Tyr

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Val Leu Lys Glu Ser Asn Arg Ile Gln Ser Ser Ile Asn Leu Thr
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Glu Gly Pro Leu Leu Lys Ala Ala Ile Phe Glu Thr Asp Gln Gly
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10297.204.ST25.txt

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Page 65

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10297.204.ST25.txt

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 tatgaaaggg ggatacgatc ttg agc cag ttt aaa aaa gaa cat gtc caa gac 533
 1 5 10
 Leu Ser Gln Phe Lys Lys Glu His Val Gln Asp
 ata tac tat ttg tca ccg atg cag gaa ggg atg ctg ttt cat acg ctg 581
 ile Tyr Tyr Leu Ser Pro Met Gln Glu Gly Met Leu Phe His Thr Leu
 15 20 25
 ctg cat ccg ggg caa ggc ttt tat att gaa caa atc agc atg cag gtg 629
 leu His Pro Gly Gln Gly Phe Tyr Ile Glu Gln Ile Ser Met Gln Val
 30 35 40
 aaa ggc tct ttt caa aag gat gta ttg gaa aaa agc atg aat gtc atc 677
 Lys Gly Ser Phe Gln Lys Asp Val Leu Glu Lys Ser Met Asn Val Ile
 45 50 55
 atc ggc agg tat gat ata ttc cga acc gtt ttc gtt cat gaa aaa atg 725
 ile Gly Arg Tyr Asp ile Phe Arg Thr Val Phe Val His Glu Lys Met
 60 65 70 75
 aaa cgt ccg gtt caa gtc gtt tta aag gaa agg tca ttt cag gca gaa 773
 Lys Arg Pro Val Gln Val Val Leu Lys Glu Arg Ser Phe Gln Ala Glu
 80 85 90
 gaa att gat cta tca gga ctt tct gaa gca gaa caa aat gag aga att 821
 Glu ile Asp Leu Ser Gly Leu Ser Glu Ala Glu Gln Asn Glu Arg ile
 95 100 105
 gaa gat tat aaa cga aaa gat aaa gaa aaa gga ttt aac ctc tca aaa 869
 Glu Asp Tyr Lys Arg Lys Asp Lys Glu Lys Gly Phe Asn Leu Ser Lys
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 gac att ccg atg aga acg gcg gtt ttt aag aag ggg cag gat cgt tac 917
 Asp ile Pro Met Arg Thr Ala Val Phe Lys Lys Gly Gln Asp Arg Tyr
 125 130 135
 gaa tgg gtg tgg agc tat cat cat att ctg ctt gac gga tgg tgc ttc 965
 Glu Trp Val Trp Ser Tyr His His ile Leu Leu Asp Gly Trp Cys Phe
 140 145 150 155
 ggc att gtc gta cag gag ctg ttc gaa gta tac aac gcg ctc cgt gaa 1013
 Gly ile Val Val Gln Glu Leu Phe Glu Val Tyr Asn Ala Leu Arg Glu

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Lys	Trp	Leu	Glu	Ser	Gln	Asp	Lys	Gln	Lys	Ser	Leu	Val	Tyr	Trp	Glu															
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Ala	Asn	Lys	Gln	Gln	Lys	Glu	Lys	Asn	Leu	Gly	Phe	Thr	Met	Asp	Glu															
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Pro	Gly	Glu	Glu	Met	Met	Leu	Lys	Leu	Ala	Tyr	Asn	Arg	Asn	Ile	Phe															
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Glu	Pro	Ser	Phe	Ile	Leu	Arg	Leu	Lys	Glu	Gln	Leu	Leu	Thr	Ala	Ile															
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Val	Gln	Arg	Lys	Gln	Ile	Gly	Leu	Thr	Ile	Pro	Gln	Trp	Phe	Glu	Gln	
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Tyr	Ala	Glu	Ala	Leu	Pro	Glu	Lys	Pro	Ala	Val	Ser	Ala	Ala	Gly	Arg	
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Thr	Leu	Thr	Tyr	Arg	Glu	Leu	Asn	Glu	Lys	Ala	Asn	Lys	Val	Ala	His	
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Phe	Arg	Arg	Ser	Pro	Glu	Met	Val	Ile	Ala	Ile	Leu	Ala	Val	Leu	Lys	
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Ile	Leu	Ile	Asp	Asp	Pro	Ala	Val	Ser	Ala	Glu	Ser	Gly	Arg	Asn	Leu	
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Glu	Ile	Ala	Ala	Glu	Pro	Asp	Asp	Leu	Ala	Tyr	Ile	Met	Tyr	Thr	Ser	
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Gly	Thr	Thr	Gly	Lys	Pro	Lys	Gly	Asn	Leu	Thr	Thr	His	Ala	Asn	Ile	
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Thr	Arg	Val	Val	Lys	Glu	Thr	Asn	Tyr	Ile	Ser	Leu	Ser	Glu	Lys	Asp	
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Thr	Leu	Leu	Ser	Leu	Ser	Asn	Tyr	Ala	Phe	Asp	Gly	Phe	Thr	Phe	Asp	
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Ala	Thr	Ile	Leu	His	Ile	Gly	Lys	Leu	Thr	Glu	Ala	Ile	Gln	Lys	Glu	
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gga gag cgc tca tct gtc agc cat gtc aag aaa gca ttt gct gcc atg Gly Glu Arg Ser Ser Val Ser His Val Lys Lys Ala Phe Ala Ala Met 735 740 745				2741
gga ccg gac agg atc atc cat gta tac ggg ccg acg gaa acg acc gtc Gly Pro Asp Arg Ile Ile His Val Tyr Gly Pro Thr Glu Thr Thr Val 750 755 760				2789
ttc gcg acg ttc tat ccg gtc aac cgt atg gaa gac agc gcg gtt tcc Phe Ala Thr Phe Tyr Pro Val Asn Arg Met Glu Asp Ser Ala Val Ser 765 770 775				2837
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agc ggt aca gga gta tcg cgc ggc tat ttg aac agg ccg gaa ctg act Ser Gly Thr Gly Val Ser Arg Gly Tyr Leu Asn Arg Pro Glu Leu Thr 815 820 825				2981
gcg gaa aaa ttc gcg ccg cat ccg ttt aac agc ggt gaa acg atg tac Ala Glu Lys Phe Ala Pro His Pro Phe Asn Ser Gly Glu Thr Met Tyr 830 835 840				3029
agg acg gga gat ctg gcc cgc tgg ctg ccg gac ggc aat atc gac ttc Arg Thr Gly Asp Leu Ala Arg Trp Leu Pro Asp Gly Asn Ile Asp Phe 845 850 855				3077
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ctg Leu	aaa Lys 1020	gat Asp	ctc Leu	gca Ala	atc Ile	gat Asp 1025	gtt Val	ccg Pro	gtg Val	aat Asn	gtg Val 1030	ttg Leu	ttt Phe	gaa Glu		3599
atg Met	ccc Pro 1035	aca Thr	atc Ile	gag Glu	ggc Gly	ctc Leu 1040	gcg Ala	gct Ala	tat Tyr	atc Ile	gac Asp 1045	caa Gln	ggc Gly	ggc Gly		3644
cat His	gtg Val 1050	gat Asp	gaa Glu	gtg Val	aaa Lys	aaa Lys 1055	acc Thr	gtc Val	ttc Phe	aat Asn	cag Gln 1060	gca Ala	agc Ser	acc Thr		3689
cgc Arg	cat His 1065	ttg Leu	ttc Phe	gct Ala	ttc Phe	ccg Pro 1070	cct Pro	gtc Val	ctc Leu	gga Gly	tac Tyr 1075	ggc Gly	atc Ile	atg Met		3734
tac Tyr	ggc Gly 1080	aag Lys	ctg Leu	gcc Ala	gaa Glu	caa Gln 1085	atg Met	ccg Pro	gaa Glu	tac Tyr	agg Arg 1090	att Ile	cac His	gcg Ala		3779
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ccg Pro	gca Ala	tgg Trp	ctt Leu	tcg Ser	ttg Leu	tgg Trp	aaa Lys	gaa Glu	gga Gly	acg Thr	gag Glu	tct Ser	tca Ser	tat Tyr		4229

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 35 40 45
 Lys Asp Val Leu Glu Lys Ser Met Asn Val Ile Ile Gly Arg Tyr Asp
 50 55 60
 Ile Phe Arg Thr Val Phe Val His Glu Lys Met Lys Arg Pro Val Gln
 65 70 75 80
 Val Val Leu Lys Glu Arg Ser Phe Gln Ala Glu Glu Ile Asp Leu Ser
 85 90 95
 Gly Leu Ser Glu Ala Glu Gln Asn Glu Arg Ile Glu Asp Tyr Lys Arg
 100 105 110
 Lys Asp Lys Glu Lys Gly Phe Asn Leu Ser Lys Asp Ile Pro Met Arg
 115 120 125

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Thr Ala Val Phe Lys Lys Gly Gln Asp Arg Tyr Glu Trp Val Trp Ser
 130 135 140

Tyr His His Ile Leu Leu Asp Gly Trp Cys Phe Gly Ile Val Val Gln
 145 150 155 160

Glu Leu Phe Glu Val Tyr Asn Ala Leu Arg Glu Asn Arg Pro Tyr Ser
 165 170 175

Leu Gly Pro Val Arg Pro Tyr Lys Glu Tyr Ile Lys Trp Leu Glu Ser
 180 185 190

Gln Asp Lys Gln Lys Ser Leu Val Tyr Trp Glu His His Leu Ala Gly
 195 200 205

Phe Glu Gly Gln Thr Thr Phe Ser Glu Gln Arg Lys Asn Pro Glu Gln
 210 215 220

Ala Gly Asn Gln Pro Glu Glu Leu Leu Phe Thr Leu Pro Lys Glu Asp
 225 230 235 240

Thr Glu Ala Phe Thr Gln Leu Ala Lys Ala His His Thr Thr Leu Ser
 245 250 255

Thr Ala Leu Gln Ala Val Trp Ser Val Leu Leu Ser Arg Tyr Gln Arg
 260 265 270

Ser Arg Asp Leu Ile Phe Gly Thr Val Val Ser Gly Arg Pro Ala Asp
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Ile Gln Gly Val Glu His Met Val Gly Leu Phe Ile Asn Val Val Pro
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Lys Arg Ala Thr Phe Gly Pro Gln Thr Thr Phe Thr Glu Leu Val Ala
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Asp Leu Gln Lys Gln Ala Leu Glu Ala Glu Pro His Gln Tyr Val Pro
 325 330 335

Leu Tyr Glu Ile Gln Ser His Ile Ala Ala Pro Asn Leu Ile Asp His
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Ile Ile Val Phe Glu Asn Tyr Pro Leu Gln Glu Ala Asn Lys Gln Gln
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Lys Glu Lys Asn Leu Gly Phe Thr Met Asp Glu Ile Ser Val Phe Glu
 370 375 380

Lys Ser Asn Tyr Asp Leu Asn Leu Leu Ala Ser Pro Gly Glu Glu Met
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Asp Pro Glu Gln Pro Leu Asp Asp Ile Cys Val Val Ser Lys Lys Glu
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Ile Gly Leu Thr Ile Pro Gln Trp Phe Glu Gln Tyr Ala Glu Ala Leu
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Pro Glu Lys Pro Ala Val Ser Ala Ala Gly Arg Thr Leu Thr Tyr Arg
485 490 495

Glu Leu Asn Glu Lys Ala Asn Lys Val Ala His Leu Leu Arg Lys Lys
500 505 510

Asn Val Gly Arg Gly Glu Pro Val Ala Leu Leu Phe Arg Arg Ser Pro
515 520 525

Glu Met Val Ile Ala Ile Leu Ala Val Leu Lys Ala Gly Gly Ala Tyr
530 535 540

Leu Pro Ile Asp Pro Glu Tyr Pro Glu Ala Arg Ile Gln Tyr Met Leu
545 550 555 560

Glu Asp Ser Gly Ala Val Cys Met Leu Thr Gln Glu Glu Leu Ala Gly
565 570 575

Arg Ala Ala Ser Leu Ser Phe His Lys His Thr Ile Leu Ile Asp Asp
580 585 590

Pro Ala Val Ser Ala Glu Ser Gly Arg Asn Leu Glu Ile Ala Ala Glu
595 600 605

Pro Asp Asp Leu Ala Tyr Ile Met Tyr Thr Ser Gly Thr Thr Gly Lys
610 615 620

Pro Lys Gly Asn Leu Thr Thr His Ala Asn Ile Thr Arg Val Val Lys
625 630 635 640

Glu Thr Asn Tyr Ile Ser Leu Ser Glu Lys Asp Thr Leu Leu Ser Leu
645 650 655

Ser Asn Tyr Ala Phe Asp Gly Phe Thr Phe Asp Leu Tyr Gly Ala Leu
660 665 670

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Leu Asn Gly Ala Lys Leu Val Val Ala Asp Gln Ala Thr Ile Leu His
 675 680 685

Ile Gly Lys Leu Thr Glu Ala Ile Gln Lys Glu Asn Ile Thr Val Met
 690 695 700

Phe Val Thr Thr Ala Leu Phe Asn Leu Leu Val Asp Ala Gly Thr Gly
 705 710 715 720

Trp Met Lys Gly Ile Arg Lys Val Leu Phe Gly Gly Glu Arg Ser Ser
 725 730 735

Val Ser His Val Lys Lys Ala Phe Ala Ala Met Gly Pro Asp Arg Ile
 740 745 750

Ile His Val Tyr Gly Pro Thr Glu Thr Thr Val Phe Ala Thr Phe Tyr
 755 760 765

Pro Val Asn Arg Met Glu Asp Ser Ala Val Ser Ile Pro Ile Gly Lys
 770 775 780

Pro Ile Asn Glu Thr Asn Ala Tyr Ile Leu Thr Glu Asn Asn Arg Leu
 785 790 795 800

Gln Pro Ile Gly Ala Val Gly Glu Leu Cys Leu Ser Gly Thr Gly Val
 805 810 815

Ser Arg Gly Tyr Leu Asn Arg Pro Glu Leu Thr Ala Glu Lys Phe Ala
 820 825 830

Pro His Pro Phe Asn Ser Gly Glu Thr Met Tyr Arg Thr Gly Asp Leu
 835 840 845

Ala Arg Trp Leu Pro Asp Gly Asn Ile Asp Phe Ile Gly Arg Ile Asp
 850 855 860

Asp Gln Val Lys Ile Arg Gly His Arg Ile Glu Leu Gly Glu Ile Glu
 865 870 875 880

Glu Gln Leu Met Arg Cys Gln Gly Val Lys Glu Ala Val Val Thr Ala
 885 890 895

Arg Lys Ser Gly Asn Gly Asp Ala Ala Leu Thr Ala Tyr Val Val Pro
 900 905 910

Val Gln Gly Thr Glu Val Ala Asn Glu Glu Val Arg Arg Gln Leu Ala
 915 920 925

Arg Arg Leu Pro Ala Tyr Met Val Pro Ala Ala Tyr Ile Met Leu Glu
 930 935 940

10297.204.ST25.txt

Glu Leu Pro Leu Thr Ala Asn Gly Lys Val Asn Arg Arg Leu Leu Pro
 945 950 955 960
 Glu Ala Asp Gly Arg Pro Asn Ser Thr Glu Arg Arg Ala Pro Arg Asn
 965 970 975
 Ala Thr Glu Glu Lys Leu Ala Val Ile Trp Ser Glu Val Leu Gly Arg
 980 985 990
 Gln Gln Ile Gly Ile Asp Glu Asn Phe Phe Glu Ile Gly Gly His Ser
 995 1000 1005
 Leu Lys Ala Met Ala Val Ala Ser Arg Met Leu Lys Asp Leu Ala
 1010 1015 1020
 Ile Asp Val Pro Val Asn Val Leu Phe Glu Met Pro Thr Ile Glu
 1025 1030 1035
 Gly Leu Ala Ala Tyr Ile Asp Gln Gly Gly His Val Asp Glu Val
 1040 1045 1050
 Lys Lys Thr Val Phe Asn Gln Ala Ser Thr Arg His Leu Phe Ala
 1055 1060 1065
 Phe Pro Pro Val Leu Gly Tyr Gly Ile Met Tyr Gly Lys Leu Ala
 1070 1075 1080
 Glu Gln Met Pro Glu Tyr Arg Ile His Ala Phe Asp Phe Ile Glu
 1085 1090 1095
 Ser Asp Asp Arg Ala Val Arg Tyr Ala Glu Ala Ile Ser Asp Leu
 1100 1105 1110
 Gln Pro Glu Gly Pro Leu Thr Leu Ile Gly Tyr Ser Ala Gly Cys
 1115 1120 1125
 Gly Leu Ala Phe Glu Val Ala Gln Ala Leu Glu Lys Asn Gly Arg
 1130 1135 1140
 Lys Val Glu Lys Leu Leu Met Ile Asp Ser Tyr Met Lys Asn Asp
 1145 1150 1155
 Val Ser Asp Leu Glu Gly Arg Ser Ile Glu Ala Asp Thr Ala Ala
 1160 1165 1170
 Leu Met Glu Ala Asn Lys Asp Asn Glu Tyr Met Lys Ile Lys Thr
 1175 1180 1185
 Val Ala Asp Gly Ile Ala Lys Lys Met Thr Ala Tyr Tyr Ser Tyr
 1190 1195 1200

10297.204.ST25.txt

Phe Val Asn Leu Val His Gln Gly Thr Val Ser Ser Glu Ile His
1205 1210 1215

Leu Ile Lys Ser Glu His Ala Lys Pro Leu Pro Ala Trp Leu Ser
1220 1225 1230

Leu Trp Lys Glu Gly Thr Glu Ser Ser Tyr Asp Glu Tyr Gln Gly
1235 1240 1245

Ala Gly Arg His Asp Glu Met Leu Ala Asp Gly Phe Val Lys Ser
1250 1255 1260

Asn Ala Asp Leu Ile Arg Gln Ile Leu Gly Glu Arg Ala Ala Val
1265 1270 1275

Ile Gly Gly Ala
1280

<210> 19
<211> 1678
<212> DNA
<213> Bacillus licheniformis

<220>
<221> CDS
<222> (501)..(1178)

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tcccgtttat tcggcagcaa atgccgcttg ggaaaaggcg tgtattcgct ttccctgtct 180
tttgagacca ctccgaccag cagcaattcc ggcatttcct gactcgaaaa cagcttttcg 240
attgagcgca gactgttgct gtatgccgga tcgaataaat ctcccagggtc atggacgtat 300
agaacgggat agcggttttc accgctcccg tatgaaggag gaagatagat caaaagctcc 360
ctcccgaagc atgtatcttt tatcaatgtt ccgtctatca tgttcattac tccattctgc 420
acaagtatca tgcctatctt tcctgctgtc tgtttgctaa aatgaaagca gaaaaatc 480
atgtgaagag gttgcgtttg atg aag att tac gcc gtt tat atg gat cag ctg 533
Met Lys Ile Tyr Ala Val Tyr Met Asp Gln Leu
1 5 10
ccg gaa gcc ggt caa ttt aac cga atg atg gcc atg gtg tct gaa gaa 581
Pro Glu Ala Gly Gln Phe Asn Arg Met Met Ala Met Val Ser Glu Glu
15 20 25
aag cga aaa aaa gtg ggc aga tac aga tat ccc gaa gat gcc agc cgg 629
Lys Arg Lys Lys Val Gly Arg Tyr Arg Tyr Pro Glu Asp Ala Ser Arg
30 35 40
acg ctg atc gga gaa gtg ctg gcg agg cac atc atc agc gaa acg ttt 677
Thr Leu Ile Gly Glu Val Leu Ala Arg His Ile Ile Ser Glu Thr Phe
45 50 55

10297.204.ST25.txt

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cat ttg ccg aat gag cag atc cgt ttt aca gaa gga agg tac ggc aaa      725
His Leu Pro Asn Glu Gln Ile Arg Phe Thr Glu Gly Arg Tyr Gly Lys
60                               65                               70                               75

ccg gct gct gaa ggt ctg aac gac ttt cat ttc aac att tcc cac tcc      773
Pro Ala Ala Glu Gly Leu Asn Asp Phe His Phe Asn Ile Ser His Ser
80                               85                               90

gga aaa tgg atc gtg tgc gga gcc ggc gcg cag ccg atc gga gtg gat      821
Gly Lys Trp Ile Val Cys Gly Ala Gly Ala Gln Pro Ile Gly Val Asp
95                               100                               105

gtc gaa aag atc aag ccg atc aat ttc gac att gcc aaa cgg ttt ttt      869
Val Glu Lys Ile Lys Pro Ile Asn Phe Asp Ile Ala Lys Arg Phe Phe
110                               115                               120

tca cct tcc gag cac gat gat ctc atg gaa aag gac gaa tca gaa cgc      917
Ser Pro Ser Glu His Asp Asp Leu Met Glu Lys Asp Glu Ser Glu Arg
125                               130                               135

ctg tcg tat ttc tat cat ttg tgg acg atg aaa gaa agc ttt att aaa      965
Leu Ser Tyr Phe Tyr His Leu Trp Thr Met Lys Glu Ser Phe Ile Lys
140                               145                               150                               155

cag gcg gga aaa ggc ctg tct ctg ccg ctt gat tcc ttc tcc gtc aaa      1013
Gln Ala Gly Lys Gly Leu Ser Leu Pro Leu Asp Ser Phe Ser Val Lys
160                               165                               170

ctg aac gaa cag ggg cga gct tcg gtg gaa act ccc ccc ggc tat ccg      1061
Leu Asn Glu Gln Gly Arg Ala Ser Val Glu Thr Pro Pro Gly Tyr Pro
175                               180                               185

cct tgc tat ata caa gcc tat gaa att gac ccc ggc tat aaa atg gcg      1109
Pro Cys Tyr Ile Gln Ala Tyr Glu Ile Asp Pro Gly Tyr Lys Met Ala
190                               195                               200

gtg tgt tcc gcc gca cct gaa ttt ccc ggc cgg att gtg atg aaa agc      1157
Val Cys Ser Ala Ala Pro Glu Phe Pro Gly Arg Ile Val Met Lys Ser
205                               210                               215

tgc gct gaa ctg tca atg ctt taaaaagtcc cgccctaaaa ataagcggtt      1208
Cys Ala Glu Leu Ser Met Leu
220                               225

tccaccgctt gccgcaaccg ctcgatgccg ctgcggatgt cctcttcctt cacattggac      1268

gtattgattt tcaatagatt tcttttttggg aaagccggca tataatgagc gttgaccggt      1328

tcgagcagga cgtcccgttt ttgtaggctt ttaatcagac gggatgccgg gatcgtccgg      1388

tccaattcaa tatgggtgtg gatagccggc tgtgcgggag gatgaaattc aaacacatcc      1448

cctagagacg cggaacattc ttttagcaga tcatgcagaa ggcatgatct tttttgatag      1508

gaagaacgga tcttttgctt atgcttttca aacatcccg ctttcaaata gatctccaaa      1568

gcggcctgag acagcatgga actgtcaatg tcgagcagct gtttgtaccg gttgaacaca      1628

attgtcagag aatcggggcag cacggcggtt ccgacccgca gacccggaaa      1678

<210> 20
<211> 226
<212> PRT
<213> Bacillus licheniformis
<400> 20

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10297.204.ST25.txt

Met Lys Ile Tyr Ala Val Tyr Met Asp Gln Leu Pro Glu Ala Gly Gln
 1 5 10 15
 Phe Asn Arg Met Met Ala Met Val Ser Glu Glu Lys Arg Lys Lys Val
 20 25 30
 Gly Arg Tyr Arg Tyr Pro Glu Asp Ala Ser Arg Thr Leu Ile Gly Glu
 35 40 45
 Val Leu Ala Arg His Ile Ile Ser Glu Thr Phe His Leu Pro Asn Glu
 50 55 60
 Gln Ile Arg Phe Thr Glu Gly Arg Tyr Gly Lys Pro Ala Ala Glu Gly
 65 70 75 80
 Leu Asn Asp Phe His Phe Asn Ile Ser His Ser Gly Lys Trp Ile Val
 85 90 95
 Cys Gly Ala Gly Ala Gln Pro Ile Gly Val Asp Val Glu Lys Ile Lys
 100 105 110
 Pro Ile Asn Phe Asp Ile Ala Lys Arg Phe Phe Ser Pro Ser Glu His
 115 120 125
 Asp Asp Leu Met Glu Lys Asp Glu Ser Glu Arg Leu Ser Tyr Phe Tyr
 130 135 140
 His Leu Trp Thr Met Lys Glu Ser Phe Ile Lys Gln Ala Gly Lys Gly
 145 150 155 160
 Leu Ser Leu Pro Leu Asp Ser Phe Ser Val Lys Leu Asn Glu Gln Gly
 165 170 175
 Arg Ala Ser Val Glu Thr Pro Pro Gly Tyr Pro Pro Cys Tyr Ile Gln
 180 185 190
 Ala Tyr Glu Ile Asp Pro Gly Tyr Lys Met Ala Val Cys Ser Ala Ala
 195 200 205
 Pro Glu Phe Pro Gly Arg Ile Val Met Lys Ser Cys Ala Glu Leu Ser
 210 215 220
 Met Leu
 225

<210> 21
 <211> 1738
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 <213> Bacillus licheniformis

<220>

10297.204.ST25.txt

<221> CDS

<222> (501)..(1238)

<400> 21

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atgtcagcga tttagaaggg cggtaattg aagccgatac ggccgccttg atggaagcca      180
acaaggacaa tgaatatatg aaaatcaaga cggttgccga tggcatcgct aaaaagatga      240
cagcctatta ttcttacttt gtcaatcttg tccatcaagg aacggtcagc tcggagattc      300
at ttgatcaa atcagagcac gcaaaaccgc tcccggcatg gctttcgttg tggaaagaag      360
gaacggagtc ttcatatgat gaatatcaag gcgctggaag acatgatgaa atgcttgcgg      420
acggctttgt taaaagcaac gcagatctca tcagacagat tttgggcgaa cgtgccgctg      480
taatcggagg tgcatgatgc atg aac gag atc att aag cag ttt gga gcg ccg      533
                    Met Asn Glu Ile Ile Lys Gln Phe Gly Ala Pro
                    1                               5                               10

gca agc ggt atg cag ttg atc tgt ttc ccg ttt gcc ggg gga tat tcg      581
Ala Ser Gly Met Gln Leu Ile Cys Phe Pro Phe Ala Gly Gly Tyr Ser
                    15                               20                               25

gca tca ttc aga ccg ctt cac gaa cat tta aaa aca gat ttt gat atg      629
Ala Ser Phe Arg Pro Leu His Glu His Leu Lys Thr Asp Phe Asp Met
                    30                               35                               40

ctg gcg atc gaa ccg cct gga cac ggc aca aat cga atg gcg ctt gtc      677
Leu Ala Ile Glu Pro Pro Gly His Gly Thr Asn Arg Met Ala Leu Val
                    45                               50                               55

gac aat ttg gaa aag ctc gcc gat ttg tat ata gcg gcg ctt aag ccg      725
Asp Asn Leu Glu Lys Leu Ala Asp Leu Tyr Ile Ala Ala Leu Lys Pro
                    60                               65                               70                               75

cgg ctt tcc tct caa ttc gtg ctg ttc ggc cac agt atg ggc ggc atg      773
Arg Leu Ser Ser Gln Phe Val Leu Phe Gly His Ser Met Gly Gly Met
                    80                               85                               90

gtt gtt tac agg ctg gcg caa aag ctt gaa caa gaa ggg atc ttt ccg      821
Val Val Tyr Arg Leu Ala Gln Lys Leu Glu Gln Glu Gly Ile Phe Pro
                    95                               100                               105

gca gcc gct gtg ata tca gcg ata cag ccg ccc cat att cag cgg caa      869
Ala Ala Ala Val Ile Ser Ala Ile Gln Pro Pro His Ile Gln Arg Gln
                    110                               115                               120

aag gtg tct cac caa aag gat gac gca ttt ctc gac cat ctc att cag      917
Lys Val Ser His Gln Lys Asp Asp Ala Phe Leu Asp His Leu Ile Gln
                    125                               130                               135

ctt ggc gga ata ccc aaa gaa ctg gca gag cac agg gaa atg atg aac      965
Leu Gly Gly Ile Pro Lys Glu Leu Ala Glu His Arg Glu Met Met Asn
                    140                               145                               150                               155

ttt ttc ctg cct tcg ttc aga gcg gac tac aga gcg ctt gag acg ttc      1013
Phe Phe Leu Pro Ser Phe Arg Ala Asp Tyr Arg Ala Leu Glu Thr Phe
                    160                               165                               170

tgc cat acc gat cat acg ccg ctt aga tcg cct gtg cat att ctg aac      1061
Cys His Thr Asp His Thr Pro Leu Arg Ser Pro Val His Ile Leu Asn
                    175                               180                               185

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10297.204.ST25.txt

gga gac cgc gat gag aaa tgc atg agg gat gcg ctt ggc tgg aaa aag 1109
 Gly Asp Arg Asp Glu Lys Cys Met Arg Asp Ala Leu Gly Trp Lys Lys
 190 195 200

tgg gcg aat acg atc gat ttc cac tat ttc aaa ggc gga cat atg tat 1157
 Trp Ala Asn Thr Ile Asp Phe His Tyr Phe Lys Gly Gly His Met Tyr
 205 210 215

ctt tta tca gaa acg gaa caa gta gcc gcc aag ttg aaa acg att gcc 1205
 Leu Leu Ser Glu Thr Glu Gln Val Ala Ala Lys Leu Lys Thr Ile Ala
 220 225 230 235

gcg gcc agc cgc agt acg gct gtt ccg aca atg taaagaaagc ggaaaatcgg 1258
 Ala Ala Ser Arg Ser Thr Ala Val Pro Thr Met
 240 245

tgtgctgcag ctgccgattt tccgtttttt cagctttttt tcagccgatt ttcccgccga 1318
 accatcgctc ccccaataat tccggcaatg atcatccccg ttccggcgaa gtgaaaccat 1378
 tcgagtgatt ctcccagcca tataatcccc gccaaaatcg tcaccagtgt cgccaagtga 1438
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 ttgaaaaaaaa gaaatcccgc tcccgttgtg acatatgtta attcaagcga gctgaagggtt 1678
 cgcgtcatct ttctggcgag cagcgtgtag cccgccgatg aaagcgccga aagcaaaatc 1738

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 <212> PRT
 <213> Bacillus licheniformis

<400> 22

Met Asn Glu Ile Ile Lys Gln Phe Gly Ala Pro Ala Ser Gly Met Gln
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Leu Ile Cys Phe Pro Phe Ala Gly Gly Tyr Ser Ala Ser Phe Arg Pro
 20 25 30

Leu His Glu His Leu Lys Thr Asp Phe Asp Met Leu Ala Ile Glu Pro
 35 40 45

Pro Gly His Gly Thr Asn Arg Met Ala Leu Val Asp Asn Leu Glu Lys
 50 55 60

Leu Ala Asp Leu Tyr Ile Ala Ala Leu Lys Pro Arg Leu Ser Ser Gln
 65 70 75 80

Phe Val Leu Phe Gly His Ser Met Gly Gly Met Val Val Tyr Arg Leu
 85 90 95

Ala Gln Lys Leu Glu Gln Glu Gly Ile Phe Pro Ala Ala Ala Val Ile
 100 105 110

10297.204.ST25.txt

Ser Ala Ile Gln Pro Pro His Ile Gln Arg Gln Lys Val Ser His Gln
 115 120 125

Lys Asp Asp Ala Phe Leu Asp His Leu Ile Gln Leu Gly Gly Ile Pro
 130 135 140

Lys Glu Leu Ala Glu His Arg Glu Met Met Asn Phe Phe Leu Pro Ser
 145 150 155 160

Phe Arg Ala Asp Tyr Arg Ala Leu Glu Thr Phe Cys His Thr Asp His
 165 170 175

Thr Pro Leu Arg Ser Pro Val His Ile Leu Asn Gly Asp Arg Asp Glu
 180 185 190

Lys Cys Met Arg Asp Ala Leu Gly Trp Lys Lys Trp Ala Asn Thr Ile
 195 200 205

Asp Phe His Tyr Phe Lys Gly Gly His Met Tyr Leu Leu Ser Glu Thr
 210 215 220

Glu Gln Val Ala Ala Lys Leu Lys Thr Ile Ala Ala Ala Ser Arg Ser
 225 230 235 240

Thr Ala Val Pro Thr Met
 245